THE ROLE OF WATER QUALITY TRADING IN ACHIEVING CLEAN WATER OBJECTIVES

(113–60)

HEARING

BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

COMMITTEE ON
TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRTEENTH CONGRESS

SECOND SESSION

MARCH 25, 2014

Printed for the use of the
Committee on Transportation and Infrastructure

Available online at: http://www.gpo.gov/fdsys/browse/committee.action?chamber=house&committee=transportation

U.S. GOVERNMENT PRINTING OFFICE

87–287 PDF WASHINGTON : 2014

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE

BILL SHUSTER, Pennsylvania, *Chairman*

DON YOUNG, Alaska
THOMAS E. PETRI, Wisconsin
HOWARD COBLE, North Carolina
JOHN J. DUNCAN, JR., Tennessee, *Vice Chair*
JOHN L. MICA, Florida
FRANK A. LOBIONDO, New Jersey
GARY G. MILLER, California
SAM GRAVES, Missouri
SHELLEY MOORE CAPITO, West Virginia
CANDICE S. MILLER, Michigan
DUNCAN HUNTER, California
ERIC A. "RICK" CRAWFORD, Arkansas
LOU BARLETTA, Pennsylvania
BLAKE FARENTHOLD, Texas
LARRY BUCSHON, Indiana
BOB GIBBS, Ohio
PATRICK MEEHAN, Pennsylvania
RICHARD L. HANNA, New York
DANIEL WEBSTER, Florida
STEVE SOUTHERLAND, II, Florida
JEFF DENHAM, California
REID J. RIBBLE, Wisconsin
THOMAS MASSIE, Kentucky
STEVE DAINES, Montana
TOM RICE, South Carolina
MARKWAYNE MULLIN, Oklahoma
ROGER WILLIAMS, Texas
MARK MEADOWS, North Carolina
SCOTT PERRY, Pennsylvania
RODNEY DAVIS, Illinois
MARK SANFORD, South Carolina
DAVID W. JOLLY, Florida
NICK J. RAHALL, II, West Virginia
PETER A. DEFAZIO, Oregon
ELEANOR HOLMES NORTON, District of Columbia
JERROLD NADLER, New York
CORRINE BROWN, Florida
EDDIE BERNICE JOHNSON, Texas
ELIJAH E. CUMMINGS, Maryland
RICK LARSEN, Washington
MICHAEL E. CAPUANO, Massachusetts
TIMOTHY H. BISHOP, New York
MICHAEL H. MICHAUD, Maine
GRACE F. NAPOLITANO, California
DANIEL LIPINSKI, Illinois
TIMOTHY J. WALZ, Minnesota
STEVE COHEN, Tennessee
ALBIO SIRES, New Jersey
DONNA F. EDWARDS, Maryland
JOHN GARAMENDI, California
ANDRÉ CARSON, Indiana
JANICE HAHN, California
RICHARD M. NOLAN, Minnesota
ANN KIRKPATRICK, Arizona
DINA TITUS, Nevada
SEAN PATRICK MALONEY, New York
ELIZABETH H. ESTY, Connecticut
LOIS FRANKEL, Florida
CHERI BUSTOS, Illinois

SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

BOB GIBBS, Ohio, *Chairman*

DON YOUNG, Alaska
GARY G. MILLER, California
SHELLEY MOORE CAPITO, West Virginia
CANDICE S. MILLER, Michigan
ERIC A. "RICK" CRAWFORD, Arkansas, *Vice Chair*
DANIEL WEBSTER, Florida
JEFF DENHAM, California
REID J. RIBBLE, Wisconsin
THOMAS MASSIE, Kentucky
STEVE DAINES, Montana
TOM RICE, South Carolina
MARKWAYNE MULLIN, Oklahoma
MARK MEADOWS, North Carolina
RODNEY DAVIS, Illinois
MARK SANFORD, South Carolina
DAVID W. JOLLY, Florida
BILL SHUSTER, Pennsylvania *(Ex Officio)*
TIMOTHY H. BISHOP, New York
DONNA F. EDWARDS, Maryland
JOHN GARAMENDI, California
LOIS FRANKEL, Florida
ELEANOR HOLMES NORTON, District of Columbia
EDDIE BERNICE JOHNSON, Texas
GRACE F. NAPOLITANO, California
STEVE COHEN, Tennessee
JANICE HAHN, California
RICHARD M. NOLAN, Minnesota
ANN KIRKPATRICK, Arizona
DINA TITUS, Nevada
SEAN PATRICK MALONEY, New York
NICK J. RAHALL, II, West Virginia *(Ex Officio)*

CONTENTS

Committee on Transportation and Infrastructure
U.S. House of Representatives

Bill Shuster Chairman	Washington, DC 20515	Nick J. Rahall, II Ranking Member
Christopher P. Bertram, Staff Director	March 21, 2014	James H. Zoia, Democrat Staff Director

SUMMARY OF SUBJECT MATTER

TO: Members, Subcommittee on Water Resources and Environment
FROM: Staff, Subcommittee on Water Resources and Environment
RE: Hearing on "The Role of Water Quality Trading in Achieving Clean Water Objectives"

PURPOSE

On Tuesday, March 25, 2014, at 2:00 p.m., in 2167 Rayburn House Office Building, the Water Resources and Environment Subcommittee will meet to receive testimony from several public and private sector stakeholders on the potential use of water quality trading as an innovative, market-based mechanism to cost-effectively achieve local water quality improvements.

BACKGROUND

The nature of water quality problems has changed substantially in the United States from the 1970s to today. Amendments made in 1972 and 1977 to the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act (CWA), were passed by Congress in response to water pollution problems around the nation. At that time, the government wrote policies into the CWA to give state and federal agencies authority to control point sources of pollution. Since its enactment the CWA has led to the upgrading of a large portion of the country's private industrial and public wastewater facilities. These actions have led to major improvements in water quality around the nation, although the CWA's original goal of fishable, swimmable waters across the country has yet to be achieved in numerous waterbodies.

Achieving the next step in water quality improvements is proving to be more difficult, as many of today's remaining water quality problems are more dispersed or it is very costly to achieve the next increment of pollutant removal. Challenges surrounding pollution from urban stormwater and land runoff are rooted in how we build towns, landscape, grow food, and produce other economic activity. Removing additional pollutants from private industrial and

public wastewater facilities is becoming extremely expensive and difficult to achieve. With these challenges, neither the problems nor the solutions are easy. Addressing these remaining water quality problems will require new tools and new and innovative forms of implementation. Water quality trading is increasingly being looked at as an innovative, market-based mechanism to cost-effectively achieve local water quality improvements in some instances.

WHAT IS WATER QUALITY TRADING?

The CWA provides a two-tiered approach to water quality protection. At a minimum, all point source dischargers (e.g., industrial facilities and municipal sewage treatment plants) must attain technology-based requirements to limit pollutant concentrations in effluents. These requirements take the form of nationally uniform standards, which are incorporated in pollutant discharge permits issued to individual facilities. The CWA also requires that point sources meet more stringent effluent limitations in certain circumstances. If technology-based controls are insufficient to attain state-established ambient water quality standards for specific waterbodies, then these standards serve as the regulatory basis for developing more stringent effluent limitations to be applied to point sources through additional control measures. Since enactment of the CWA in 1972, the nation has made much progress towards the Act's water quality goals through its program of technology-based effluent limits for industrial and municipal point sources.

However, as the Environmental Protection Agency (EPA) and states have succeeded in regulating and reducing pollution from point sources, the relative importance of nonpoint sources of pollution to water quality has increased. Nonpoint sources (e.g., rainfall runoff from urban, suburban, and rural areas) are believed to be a significant cause of the remaining water quality impairments in many areas. Policymakers are now seeking new approaches to continue progress towards achieving water quality improvements.

Increasingly, many policymakers are interested in more cost-effective and market-based alternatives to traditional regulation. Water quality (or effluent) trading is one of the market-based innovations that is of growing interest. Water quality trading is an innovative approach that may enable water quality goals to be achieved more efficiently in some instances. The basic theory behind water quality trading is that certain dischargers or pollutant sources may be able to achieve the same degree of control as others in the same area, but at lower cost. Trading is based on the fact that sources in a watershed can face very different costs to control the same pollutant.

Trading programs allow facilities facing higher pollution control costs to meet their regulatory obligations by purchasing environmentally equivalent (or superior) pollution reductions from another source at lower cost, thus achieving the same (or better) water quality improvement at lower overall cost. Under a trading program, some dischargers could avoid a costly treatment upgrade by paying for, or otherwise arranging, equivalent (or greater) reductions in discharges of pollutants from other facilities or sources that release the same pollutants into the same receiving waters. The trading arrangements could occur, among other ways, between two or more point sources (so-called "point-to-point" trades) or between two or more point and nonpoint sources (so-called "point-to-nonpoint" trades).

The attraction of trading is that it could reduce the total cost of compliance for the regulated community and provide monetary (or other) compensation for those who exceed minimum requirements for reducing pollutants. The common denominator is providing flexibility in allocating pollution control responsibilities so as to achieve water quality goals more cost-effectively.

HOW DOES WATER QUALITY TRADING WORK?

While trading can take many different forms, the foundations of trading are that a water quality goal is established and that sources within the watershed have significantly different costs to achieve comparable levels of pollution control.

The established water quality goal helps to determine the overall pollutant loads that may be allowed from multiple sources in the watershed so that the goal is achieved. Potential trades between individual loads among individual sources then may be evaluated to determine where and how load reductions could occur that meet the goal. Successful trading situations may occur when a trade takes advantage of the fact that the multiple sources face different costs when seeking to accomplish the load reductions. The differences in costs occur due to myriad factors ranging from an individual source's production processes to its location or size to available technologies for reducing the load.

Trading allows those sources with relatively low costs to generate "nutrient credits" by reducing loads by more than is required of them. The generator of the credits then can sell these credits to relatively high-cost sources, allowing the purchaser to, in effect, "reduce" its load at less cost. The combined result is an overall achievement of pollution load reductions at a lower total cost.

Permits or total maximum daily loads (TMDLs) under the CWA drive a lot of the current activity in water quality trading. (TMDLs are the maximum amount of a pollutant a waterbody can receive and still meet applicable water quality standards.) However, it is also possible to have trading driven by local water quality needs. Not all trades occur under permits and TMDLs.

Where watershed circumstances favor trading, it can be a useful tool for achieving pollutant reductions faster and at lower cost. However, water quality trading will not work everywhere. Trading may be most encouraged when there is a "driver" that motivates facilities to seek pollutant reductions. This might be a TMDL or a more stringent water quality-based requirement in an NPDES permit. Trading also may be encouraged when various sources within the watershed have significantly different costs to control the pollutant of concern, or the necessary levels of pollutant reduction are not so large that all sources in the watershed must reduce as much as possible to achieve the total reduction needed. Otherwise, there may not be enough surplus reductions to sell or purchase. Trading should be voluntary, and watershed stakeholders and the regulatory agency must be willing to try an innovative approach and be flexible in designing and implementing the trade.

HISTORY OF WATER QUALITY TRADING

Trading is viewed as a supplement to, and not a substitute for, core regulatory programs. Water quality or effluent trading concepts have long been advocated by academics and economists as a means of achieving environmental objectives cost-effectively. A few projects were initiated in the 1980s by local groups who were searching for a means to avoid additional, and increasingly expensive, restrictions on point source discharges.

One of the first pilot trading programs started in Wisconsin's Fox River in the 1980s. Since the 1980s, there has been a number of trading programs or activities (including studies and pilots) in the United States. Trades have been approved for some of these, but actual trades had occurred in only a limited number of instances. Interest in trading programs increased in the latter 1990s and early 2000s as state water quality agencies began issuing TMDLs for impaired waterbodies. Trading is viewed as offering flexible approaches to improving water quality in the many areas where TMDLs will be required.

Water quality trading programs are emerging in an increasing number of states, such as Virginia, Pennsylvania, and Wisconsin. A first of its kind multi-state trading pilot project for nitrogen and phosphorus was launched by the Electric Power Research Institute (EPRI) with support from Ohio River state and interstate agencies in the Ohio River Basin in 2012. Currently the pilot program spans Ohio, Indiana, and Kentucky, but the same trading program structure and tools could expand to include all Ohio River Basin states and could potentially create credit markets for dozens of power plants, thousands of wastewater facilities and other industries, and over a couple of hundred thousand farmers in the region.

In March 2013, the first interstate water quality credits were generated and sold through the Ohio River Basin pilot program, and will be managed through the program. The water quality credits are being created through contracts between EPRI and the three state agriculture agencies participating in the pilot period (the Ohio Department of Natural Resources, Kentucky Division of Conservation, and Indiana State Department of Agriculture). These contracts commit each state to removing a specified number of pounds of total nitrogen and of total phosphorus over a five-year period. Each state is contracted to receive funds, which they will pass to soil and water conservation districts, which will then contract with farmers to implement approved best management practices to reduce pollution runoff from their land. The credits under the pilot are not being used to fulfill a regulatory obligation at this time, but the purchasers are entities that will likely be interested in purchasing credits to meet their permit requirements in the future if the program gets off the ground.

EPA POLICY STATEMENTS

In January 1996, EPA issued a policy statement to encourage effluent trading in watersheds. Soon thereafter, EPA issued a draft framework to implement the Agency's trading policy. It identified a series of conditions necessary for trading and a template of regulatory, economic, and technical issues to facilitate evaluation of trading opportunities. Although this document was never released as a final framework, it served to encourage the development of a number of new trading projects around the country, some partly supported with EPA grant funding and technical assistance. In 2002, EPA proposed a new water quality trading policy,

building on the 1996 policy statement and lessons learned from activities over the previous two decades. The final policy, superseding the 1996 statement and 2002 draft, was issued in 2003.

The 2003 EPA policy is intended to guide and encourage states, interstate agencies, and tribal governments in developing trading programs and projects. It identifies a number of objectives, such as to establish economic incentives for voluntary pollutant reductions from point and nonpoint sources within a watershed and to reduce the cost of compliance with water quality-based requirements. It describes several basic characteristics for trades that occur under the policy.

For example, the policy states that trading must be consistent with the CWA and should not result in violations of water quality standards. Trading must occur within the same watershed. EPA supports trading of nutrients and sediments as well as cross-pollutant trading of oxygen-demanding pollutants. EPA may consider supporting trades of other pollutants, but believes that these trades require a higher level of scrutiny. EPA does not support trading of persistent bioaccumulative toxics except potentially on a pilot basis. EPA supports trading in unimpaired waters to maintain water quality standards as well as in impaired waters. EPA supports both pre-TMDL trading and trading under a TMDL. Trading scenarios include point source-point source trades, point source-nonpoint source trades, nonpoint source-nonpoint source trades, pretreatment trades, and intra-plant trades. EPA does not support trading that results in an impairment of an existing or designated use, adversely affects drinking water systems, or exceeds a cap established under a TMDL. In addition, the trading policy does not allow trading to meet a technology-based effluent limit. Trading can be used to meet water quality based effluent limits only.

In 2004, EPA supplemented the policy by releasing a Water Quality Trading Assessment Handbook to help water quality managers and watershed stakeholders determine if, when, and where trading can be used in their watershed to make cost-effective pollutant reductions that achieve water quality standards. Then, in 2007, EPA issued a Water Quality Trading Toolkit for Permit Writers Handbook.

WITNESSES

Mr. Peter Tennant
Executive Director
Ohio River Valley Water Sanitation Commission
[On Behalf of the Ohio River Basin Trading Project and
the Association of Clean Water Administrators]

James J. Pletl, Ph.D.
Director of Water Quality
Hampton Roads Sanitation District
[On Behalf of the National Association of Clean Water Agencies]

Dr. Richard H. Moore
Professor, School of Environment and Natural Resources
The Ohio State University
Executive Director, OSU Environmental Sciences Network
Associate Director of Academics, OSU Office of Energy and the Environment

Carl Shaffer
President
Pennsylvania Farm Bureau
[On Behalf of the American Farm Bureau Federation]

Brent Fewell
Partner
Troutman Sanders LLP
[On Behalf of the National Water Quality Trading Alliance]

Ann Pesiri Swanson
Executive Director
Chesapeake Bay Commission

THE ROLE OF WATER QUALITY TRADING IN ACHIEVING CLEAN WATER OBJECTIVES

TUESDAY, MARCH 25, 2014

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The subcommittee met, pursuant to call, at 3:17 p.m., in Room 2167, Rayburn House Office Building, Hon. Bob Gibbs (Chairman of the subcommittee) presiding.

Mr. GIBBS. The Subcommittee on Water Resources and Environment of the Committee on Transportation and Infrastructure will come to order.

The first order of business, I would like to welcome our witnesses and thank them for being here today. I ask unanimous consent that our witnesses' full statements be included in the record. Without any objection, so ordered.

At this time, before we start, first of all, I want to apologize for votes and getting started about an hour and 20 minutes late. So I thank you for your indulgence.

I want to turn it over to Chairman Shuster for a comment.

Mr. SHUSTER. I thank the chairman and want to welcome Mr. Shaffer from the Pennsylvania Farm Bureau. Thanks for being here today, and all of you for coming and testifying. I have a statement that I want to give related to, but different than, the topic here today.

Today the Obama administration released a proposed rule that would dramatically expand the Federal jurisdiction over waters and wet areas in the United States, and I am sure the Pennsylvania Farm Bureau's going to be very interested in seeing how this progresses. This is another example of a disturbing pattern of the imperial Presidency that seeks to use brute force and executive action while ignoring Congress.

Our concern is that this is going to unilaterally broaden the scope of the Clean Water Act and the Federal Government's reach into everyday lives that will have adverse effects on farmers, on contractors, on people's backyards, for that matter. It will impact the Nation's economy, threaten jobs, invite costly litigation, and restrict the rights of landowners, States, and local governments to make decisions about their lands.

This massive Federal jurisdiction grab was the subject of failed legislation in the 110th and the 111th Congress. Strong bipartisan opposition, I repeat, strong bipartisan opposition, prevented those

bills from moving forward. Defeated in Congress, now the Obama administration is trying to achieve this Federal power expansion through a rulemaking.

This proposed rule supposedly aims to clarify which water bodies are subject to Federal jurisdiction under the Clean Water Act, which this committee has jurisdiction over, but I am extremely concerned that there are serious flaws with this process. Twice the Supreme Court has told the agencies that there are limits to the Federal jurisdiction under the Clean Water Act and that they had gone too far in asserting their authority.

Now the administration has taken those Supreme Court rulings and cherry-picked discrete language from them in an attempt to gain expanded authority over new waters rather than heeding the directive of the Court. It is the responsibility of Congress, not the administration, to define the scope of the jurisdiction under the Clean Water Act.

Regulations of this Nation's water must be done in a manner that responsibly protects the environment without unnecessary and costly expansion of the Federal Government. We can continue to protect our waters without unreasonable and burdensome regulations on our small businesses, farmers, and families.

I intend to hold oversight hearings on this issue in the coming weeks and to make sure that they are not able to move forward in expanded power, because, again, I think that, as Chairman Gibbs and I were talking about before, we are not certain what this means, but we have got a sick feeling in our stomachs that we know what is coming and it is going to affect all Americans in a negative way, so we are going to be vigilant and make sure that this committee and the Congress keeps its jurisdiction and its constitutional authority as we move forward.

Mr. Chairman, thank you very much for yielding.

Mr. GIBBS. Thank you, Mr. Chairman.

I would just like to make kind of a brief statement on that same issue. I haven't had a chance to delve through the rule, because it came out this afternoon, but I think it is nearly 400 pages long, I heard, and very concerned about the possible jurisdiction overstretch of the United States Environmental Protection Agency onto farmers, landowners, county road ditches, anything you can imagine, and what that impact could have on our economy and ability to grow our economy and job creation.

So, as Chairman Shuster said, we will be looking at that, and I am sure we will have some hearings in the near future where we can delve through and see what the rule, all says, but we are concerned about the possible redefining the jurisdictions of the waters of the United States versus the evaporable waters of the United States.

I will start, by the reason we are here today, here to talk about the role of water quality trading and achieving clean water objectives. And I would like to again welcome everybody for coming. Today we will hear from several public and private sector stakeholders on the potential use of water quality trading as an innovative market-based mechanism to cost-effectively achieve local water quality improvements.

The quality of our Nation's waters has improved dramatically in the United States since the enactment of the Clean Water Act in 1972, however, water quality challenges remain and achieving the next step in water quality improvement is becoming more difficult.

Many of today's remaining water quality problems are more dispersed and removing additional pollutants from private, industrial and public wastewater facilities is becoming extremely expensive and difficult to achieve. Addressing these remaining water quality problems will require new tools and new and innovative forms of implementation.

Water quality trading is increasingly being looked into as an innovative market-based mechanism to cost-effectively achieve water quality improvements in some watersheds. The basic theory behind trading is that certain pollutant sources in the watershed may be able to achieve the same degree of control as others in the same area but at a lower cost. Trading programs allow sources at relatively low cost to generate credits by reducing loads in amounts greater than what is required of them. These credits can then be sold to others for improving the cost to achieve the same reductions are ultimately much higher, thus achieving the same or better water quality improvement at lower overall cost.

Water quality trading gained my attention several years ago when I was a member of the Ohio House of Representatives and assisted in the creation of a successful water quality trading program in Holmes County, Ohio, my home county.

A local cheese producer in Holmes County was facing a regulatory dilemma with its plans to expand its operations and create new jobs. To do so would cause the company to exceed its nutrient allowances under their NPDES permit unless it installed prohibitively expensive wastewater treatment.

To solve the problem, the company partnered with the Holmes Soil and Water Conservation District, The Ohio State University, the Ohio EPA and local farmers in the watershed to manage nutrient runoff, all of them resolving in a trading program that enabled the company to grow and the watershed's health to improve. This was a win-win for both the economy and the environment. One of our witnesses today is Dr. Richard Moore, who was a direct participant in creating the program.

At today's hearing, we will hear from a variety of witnesses about other trading programs around the Nation and the issues surrounding water quality trading as a means of improving the environment and reaching compliance under the Clean Water Act.

And I would just to kind of summarize that, when I said we came from 1972 the Clean Water Act, we have come a long ways in this country in cleaning up our rivers and our lakes and our streams, and especially point source, and I think that the kind of tale goes—the first 90 percent is cleaned up, it is that last 10 percent, it is hard to clean up, hard to identify and very expensive, maybe as expensive as cleaning up the first 90 percent, and that is why we need to look at these innovative programs how we can get there and recognize the source, especially in the nonpoint, and look at innovative methods and cost-effective methods and get to the ultimate goal.

So, I want to thank the witnesses for being here. And I will turn my time over to Mr. Bishop, the ranking member of the committee.

Mr. BISHOP. Thank you very much, Mr. Chairman. And thank you for holding this hearing on water quality trading and its potential use in aiding efforts to improve water quality throughout the Nation.

In October of this year, we will celebrate the 42nd anniversary of the Clean Water Act. This landmark environmental statute is the reason the Nation's waterways have shown dramatic improvement even as the population has dramatically increased over the last 4 decades.

The successes and failures of the Clean Water Act are both expressed in two simple statements of fact. In 1972, only one-third of the Nation's waters met water quality goals. Today, approximately two-thirds of those waters meet water quality goals, but at the same time, we are only halfway there.

The challenges to addressing these remaining and chronically impaired waters are great. It is without question that the Clean Water Act is responsible for a tremendous reduction in the amounts of pollutants entering our waters from point sources, the commercial, industrial and wastewater treatment plants. Where the act has been less successful, however, is in addressing pollution associated with runoff from urban streets, agricultural sources and other similar sources. Addressing these nonpoint source of pollution would significantly advance the goals of fishable and swimmable waters established over 4 decades ago.

One concept that has been discussed for addressing chronically impaired water bodies is water quality trading, especially when addressing impairment by nutrients or sediment. Proponents of nutrient trading laud its ability to function as a tool in helping reduce continuing pollution challenges in our Nation's waters. In my own area of the country, the potential usefulness of nutrient trading is being tested to reduce the excessive nitrogen and resulting dissolved oxygen concerns of the Long Island Sound.

In the Long Island Sound, the neighboring States of New York, Connecticut, Massachusetts, Vermont, and New Hampshire, are exploring how nutrient trading can play a role in reducing the nitrogen discharges to the sound and its tributaries. The Long Island Sound States both individually and through the New England Interstate Water Pollution Control Commission have been evaluating the effectiveness and potential benefits of both point-to-point trades among the various Clean Water Act permit holders and point-to-nonpoint trades among the various regulated and unregulated discharges of nitrogen throughout the watershed.

What seems apparent from the first few years of implementation is that nutrient trading still holds the promise of achieving potentially greater water quality benefits at a reduced cost, but a significant number of questions must be resolved first. For example, pollution trading proposals must conform to the current regulatory requirements of the Clean Water Act and must not be viewed as a way of avoiding or lessening existing pollution control authorities. In addition, care must be taken to ensure that the use of trading does not in fact make matters worse for localized areas through the

creation of pollution hot spots or disproportionately affected certain populations.

Also, for a market-based trading program to be most effective, there must be an economic driver to add value to both the credits and the trades. Under the Clean Water Act, that driver is typically created through a rigorous regulatory process that requires local water quality standards be achieved. In the absence of such a driver, the market for trading would be more difficult to establish and less likely to succeed.

Finally, Mr. Chairman, because water quality trading involves the potential lessening of existing permit obligations of regulated discharges, legal questions of water quality trading, credit verification, equivalence and enforceability, must be resolved before the effectiveness and potential benefit of trading can be properly evaluated.

I look forward to working with you, Mr. Chairman, and this subcommittee to ensure that more is done to improve the quality of our Nation's waters.

I yield back the balance of my time.

Mr. GIBBS. Thank you. At this time, if other Members have a statement, they can submit it in the written record since we already made our witnesses wait around for 90 minutes.

Before we get started, I will ask unanimous consent that written testimony submitted on behalf of the Association of Clean Water Administrators be included in this hearing's record. Hearing no objection, that is so ordered.

[The information follows:]

ASSOCIATION OF CLEAN WATER ADMINISTRATORS

1221 CONNECTICUT AVENUE, N.W., 2ND FLOOR
WASHINGTON, DC 20036
TEL: 202-756-0600
FAX: 202-756-0605
WWW.ACWA-US.ORG

Perspectives on Water Quality Trading

United States House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

March 25, 2014

Hearing: The Role of Trading in Achieving Water Quality Objectives

The Association of Clean Water Administrators (ACWA, hereafter also referred to as the Association or states) is the independent, nonpartisan, national organization of state, interstate, and territorial water program managers, who on a daily basis implement the water quality programs of the Clean Water Act (CWA), including the National Pollutant Discharge Elimination System (NPDES), the CWA Section 319 non-point source program, and related compliance and enforcement activities. ACWA appreciates the opportunity to offer the following perspectives on the role of trading in achieving water quality objectives.

Generally, states support water quality trading as an important tool in the toolbox to move toward water quality goals. Water quality trading provides a larger-scale solution to address water quality concerns. Sometimes environmental impacts are not solely the result of one discharge or activity, but rather, are the cumulative result of multiple discharges or activities, with impacts potentially occurring over larger areas – as opposed to being focused near-field. Water quality trading allows for pollutant loads to be balanced across multiple facilities and over larger areas and can provide a market driven framework to achieve environmental goals and balance economic impact.

Some states have implemented successful water quality trading programs. For example, Connecticut established a water quality trading program in 2002 to address nutrient related water quality issues in Long Island Sound. The program has been successful in producing substantial reductions in nitrogen loadings while providing fiscal flexibility to affected municipalities and achieving real environmental improvements in the reduction of low oxygen stress within Long Island Sound. Other successful trading programs are under way in the Ohio River basin, in North Carolina, in the Pacific Northwest, to name just a few.

ACWA is committed to supporting the scientific and ecological underpinnings of trading. As such, in December 2013 ACWA joined the National Network on Water Quality Trading being fostered by a number of national non-governmental organizations, and in March 2014, we joined the National Water Quality Trading Alliance. Through the Network and the Alliance we hope to share beneficial

information with states and interstates that desire to incorporate trading into their water quality programs and options.

When addressing water pollution problems, it is important that states and the impacted stakeholders use the right approach. Where trading is determined, through a transparent and rich discussion process, to be that right tool, states will work with interested entities such as point sources, non-point sources, non-governmental organizations, and the public to cultivate relevant, effective, and scientifically robust programs.

Please contact ACWA's Executive Director, Alexandra Dapolito Dunn, with questions regarding this statement at the contact information above.

* * * *

Mr. GIBBS. And then also our panelists, since you have written testimony, if you could, keep your opening statements to within 5 minutes or so, that way we will have time for some question and answer and give everybody a chance to summarize it, appreciate that.

And today we have six witnesses. And our first witness is Mr. Peter Tennant. He is the executive director of the Ohio River Valley Water Sanitation Commission and on behalf of the Ohio River Basin Trading Project and Association of Clean Water Administrators.

Welcome Mr. Tennant. The floor is yours.

TESTIMONY OF PETER A. TENNANT, P.E., EXECUTIVE DIRECTOR, OHIO RIVER VALLEY WATER SANITATION COMMISSION, ON BEHALF OF THE OHIO RIVER BASIN TRADING PROJECT AND THE ASSOCIATION OF CLEAN WATER ADMINISTRATORS; JAMES J. PLETL, Ph.D., DIRECTOR OF WATER QUALITY, HAMPTON ROADS SANITATION DISTRICT, ON BEHALF OF THE NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES; RICHARD H. MOORE, Ph.D., EXECUTIVE DIRECTOR OF THE ENVIRONMENTAL SCIENCES NETWORK, ASSOCIATE DIRECTOR OF ACADEMICS FOR THE OFFICE OF ENERGY AND THE ENVIRONMENT, AND PROFESSOR IN THE SCHOOL OF ENVIRONMENT AND NATURAL RESOURCES, THE OHIO STATE UNIVERSITY; CARL SHAFFER, PRESIDENT, PENNSYLVANIA FARM BUREAU, ON BEHALF OF THE AMERICAN FARM BUREAU FEDERATION; BRENT FEWELL, ESQ., PARTNER, TROUTMAN SANDERS LLP, ON BEHALF OF THE NATIONAL WATER QUALITY TRADING ALLIANCE; AND ANN PESIRI SWANSON, EXECUTIVE DIRECTOR, CHESAPEAKE BAY COMMISSION

Mr. TENNANT. Thank you, Mr. Chairman.

Mr. GIBBS. You might want to pull that mic up to you a little bit.

Mr. TENNANT. Thank you, Mr. Chairman.

Thank you, Ranking Member Bishop.

Both of you in your opening comments successfully reduced my remarks by several minutes with some of the points you made.

I believe most people are probably aware that our Ohio River basin program reached an important milestone just a couple of weeks ago with the completion of the first three actual trades. These are point-to-nonpoint trades of nutrients, and an event that was several years in the making.

I would emphasize that at this point, it is a pilot program. There are many programs represented here today and represented through the membership of ACWA, that have been in the business longer than we have, and you hit on several of them, the cheese factory in your district, which is certainly one of the poster childs for successful trading to solve a regional problem, and the Long Island Sound program.

As you pointed out, as we reach a certain milestone of overall achievement of the Clean Water Act goals, the remaining problems are extremely challenging. Innovation is called for and new approaches just need to be considered and entered into.

I would be remiss if I didn't begin by acknowledging the collaborative leadership and membership of our project. While ORSANCO has been a key member bringing State agencies and our other stakeholders together, we wouldn't be where we are today without the leadership of the Electric Power Research Institute and specifically Jessica Fox, the project director. They have been working on development of this program for about 7 years.

Some of the other partners, American Farmland Trust, which has brought their excellent ties to the agricultural communities to the table; Troutman Sanders law firm has been a key part; Market Environmental Registry, which runs the actual program that allows you to consummate a trade online; the Ohio Farm Bureau; and the University of California at Santa Barbara, which has provided water quality modeling to verify the projected impacts of the trades, all key components. What is important is a project this massive requires that level and more of collaboration.

We have chosen to attack nutrients. Nutrients are hard. There are two things about nutrients that I typically point out. Whereas in controlling toxic pollution, toxics are things that we can say, well, they shouldn't be there. Nutrients are something that we can't say that. Without nutrients, there is no life. It is finding the balance, it is finding the right levels, and that has been one of the challenges that State agencies and interstates such as ourselves have faced for a number of years trying to figure out what is the right dose.

Also, there are multiple sources. You can't say that, well, if this one facility or this one sector would control their problem, every activity can generate nutrients to some degree, but what we have found through the trading program is that some nutrients are more readily removed than others, and if we work together, we could actually find solutions that are collaborative, that represent cost savings and are in the long run, are effective.

Again, our project right now is in a pilot phase. We do not have regulatory drivers. The companies, the electric utilities that have bought the credits are doing so on a stewardship basis. We anticipate somewhere down the road perhaps we will have the regulatory structure, the requirements that drive more people to look into the program.

What I am optimistic about is the fact that we have laid the groundwork. A number of the things that Mr. Bishop mentioned, the challenges, we have wrestled with those, we have figured out what we think are pretty good approaches to verify the effects of the trades, to set up the equivalency and so forth, and we feel that we have a program that can hit the ground—that can expand greatly when there are wider drivers.

So we look forward to it. And, again, thank you for this opportunity to speak to you today.

Mr. GIBBS. OK. Thank you.

Our next witness is Mr. James Pletl. I don't know if I said that right or not.

He is the director of Water Quality Hampton Roads Sanitation District. He is also here on behalf of the National Association of Clean Water Agencies.

Welcome. The floor is yours.

Mr. PLETL. Thank you, Chairman Gibbs, Ranking Member Bishop and members the subcommittee.

Thank you for the opportunity to appear before you today.

As Chairman Gibbs mentioned, my name is Jim Pletl. I am the director of the water quality department for the Hampton Roads Sanitation District, or HRSD, in Virginia Beach, Virginia. I also serve as the Water Quality Committee vice chair for the National Association of Clean Water Agencies, otherwise known as NACWA. It is my pleasure to be testifying on NACWA's behalf today as well as the 17 cities and counties in southeast Virginia which HRSD serves.

If there is one thing I would like to leave you with today is the understanding that water quality trading has worked for HRSD and it has allowed us to meet our nutrient permit limits while saving our rate payers millions of dollars. Our success is something I hope we can replicate nationally.

Here in the Chesapeake Bay watershed, where excessive amounts of nutrients in rivers and streams are contributing to low dissolved oxygen conditions, the reduction of nutrient loading to the bay has been a high priority. Traditionally utilities have relied on technology controls and upgrades to reduce the nutrient loadings at the end of a pipe. Though the technology approach can be effective, it is often extremely expensive. HRSD will spend over $375 million to meet the Bay TMDL requirements through 2017, and even more upgrades may be required when the TMDL is revisited in 2017.

Compliance with nutrient permit limits was accomplished by HRSD with expensive plan upgrades, but upgrades were not required at every HRSD facility, because nutrient trading between facilities was supported through regulation in Virginia. In 2005, the Virginia General Assembly authorized the concept of nutrient trading, spurring creation of the Virginia Nutrient Credit Exchange Association, which in turn created the framework for nutrient credit trading between watershed facilities, both public and private.

Trading in Virginia was based on the concept of the nutrient credit. One nutrient credit represents 1 pound of nutrients removed from a wastewater discharge beyond that required by permit. These credits can be applied to other facilities with nitrogen load limits within the same water segment or downstream of that segment, allowing those other facilities to comply with their respective limits, without expending millions of dollars to fund technology upgrades. This approach provides the same environmental result obtained by upgrading a facility and has allowed HRSD to select and upgrade the facilities that will provide the greatest amount of nutrient removal at the lowest cost.

HRSD currently trades nitrogen and phosphorous credits on an annual load basis amongst its 13 facilities across 3 watersheds of the Chesapeake Bay. One of the most significant cost saving trades for HRSD occurs on the Rappahannock River, where its Urbana plant obtains credits from other permitted facilities on this river in order to comply with its permit limits. The inability to trade nutrient credits on the Rappahannock River would have cost HRSD customers millions of dollars, but there would have been very little nutrient benefit.

Despite the availability of nutrient trading, over $2 billion of public and utility customer funds are being invested in Virginia to upgrade many of the public municipal waste water treatment plants. This investment would have been significantly higher without trading, because every facility did not require a treatment technology upgrade with trading available. I estimate the cost to HRSD's customers would have been twice to three times the cost so far realized without the ability to trade nutrient credits between our facilities.

HRSD's experience with trading has been limited to activities with other permitted discharges. Trades with nonpermitted sectors have not yet been realized in Virginia. Trading with the nonpermitted sectors like crop agriculture has been found to be somewhat problematic due primarily to the uncertainty in estimating, measuring and controlling the discharges from these sectors.

Forty years after the passage of the Clean Water Act, wastewater facilities like HRSD around the country are transforming the way they deliver clean water services. They are becoming utilities of the future, focused on doing more with less and bringing maximum value to the rate payers and communities.

At the heart of this transformation are innovative, market-based approaches, like water quality trading, that can stretch rate payer dollars while meeting environmental improvement goals; however, utilities cannot master this transformation alone. They need the support of Congress, which should promote greater adoption of watershed-based solutions. Similarly, EPA should work with delegate States to promote viable and flexible trading programs. Doing so will give utilities the green light to engage in more nutrient transactions that can yield tangible water quality improvements while addressing the affordability concerns of wastewater utilities around the country.

Thank you for the opportunity to appear before you today. I look forward to addressing any questions that the committee may have regarding my testimony.

Mr. GIBBS. Thank you. It is always good to hear how you are saving rate payers money.

Our next witness is Dr. Richard Moore. He is professor of the School of Environmental and Natural Sciences at The Ohio State University and he is also the executive director of The Ohio State University Environmental Science Network and associate director of academics at OSU Office of Energy and Environment.

And it is good to see you again, Dr. Moore. We go way back. And we started the trading project there in my home county in Holmes County, and it has been a great relationship, so welcome.

The floor is yours.

Mr. MOORE. Thank you, Chairman Gibbs, Ranking Member Bishop. It is great to be here to talk about this topic. And I am also very grateful to my fellow panelists, who we have all come a long way in the topic of water quality trading.

The Alpine Cheese nutrient trading plan is Ohio's only program based on a fully functioning NPDES permit. It is a minor permit of 0.14 million gallons per day. Prior to the trading program, the company was out of compliance for its phosphorous limits, and Ohio EPA put a hold on their permit, which included plans for a

new plant expansion. Alpine did a partial facility upgrade to 3.2 milligrams per liter and used water quality trading to reduce its concentration to the permit goal of 1 milligram of phosphorous per liter of water. Costs were reduced by having the majority of the credits earned through 15- to 20-year conservation measures so that these were paid for during the first 5 years and subsequent permits were in the second year of the second permit, were relatively inexpensive, because they only needed to be maintained.

The program has documented benefits to water quality. Just downstream from the cheese factory, the middle fork of Sugar Creek is now in full biological attainment by Ohio EPA standards. It is also a program that has not received any Federal funding, and paid its own way for staff at the local soil and water conservation district office. It grew out of a community-based Sugar Creek project centered at The Ohio State University, which teamed up with local agencies, such as the soil and water conversation districts, the Ohio Environmental Protection Agency, the Alpine Cheese Company, county commissioners, the Ohio Department of Natural Resources, the Ohio Farm Bureau, Ohio Department of Agriculture, USDA, NRCS, and our local representative, Bob Gibbs.

Prior to the Alpine Cheese trading program, our research team had several small grants from USDA, NSF and EPA to study headwater streams and implement conservation measures. It is also part of Ohio State University's extension outreach funded by the Smith-Lever Act.

The success of the Alpine Cheese nutrient trading plan served as a springboard for the creation of the Muskingum River watershed water quality trading plan in 2012. We started very small, but it spread then to these 21 counties, who all wanted to be part of it.

I have four specific recommendations for the future of water quality trading. One, water quality trading programs in Ohio should focus on minor NPDES permit holders. In Ohio, there are 3,341 active NPDES permits, according to Ohio EPA. About half the amount of water treated by NPDES permits comes from minor permits which, like Alpine Cheese, have a design flow of less than 1 million gallons per day. Major permit holders tend to have more monitoring and more limits. One of the strongest arguments for focusing on water quality trading on the minor permit holders is, the higher cost per gallon of treatment.

According to Hartman and Cleland, the cost for facility upgrades for minor permits is anywhere between two and seven times as great as the majors, depending on the phosphorous and nitrogen regulatory limits. Because of the high cost of treatment per gallon, minor permit holders are able to offer higher prices for nutrient credits if transaction costs can be kept low. This is why the Alpine plan was so effective even though the cost per credit was relatively high.

At the same time, when trading programs are started to solely benefit major permit holders, there is a drive to keep the cost per credit low, such as through reverse auctions, in order to match the low cost per gallon associated with the mayor permit facility upgrades; however, major and minor permit holders can team up in very creative ways. For example, a downstream point source could cost share with an upstream point source to conduct their facility

upgrade upstream, so that they could get below their permit level and recoup the cost through a negotiated sale of those credits, and there are other ways, too.

The second point, community-based water quality trading programs at either the HUC 8 level, or county level, provide benefits over larger scale programs. We found that the idea of a trusted broker is very important, and we think that the soil and water districts are such an entity. Also, there could be trades within the same county jurisdiction between—if county commissioners are overseeing both the soil and water conservation district budget and the county wastewater treatment plan, then it makes sense to combine those two functions.

A third point is that trading should focus on areas of most impact: headwaters and critical source areas. Studies have shown that about half the nitrogen in headwater streams makes it down to the fourth order streams. A long-term study in Illinois revealed that most of the—during rain events, we have most of the export of the nutrients.

I will stop there. Thank you.

Mr. GIBBS. Sorry. Did you finish your fourth point, Mr. Moore?

Mr. MOORE. No. Can I——

Mr. GIBBS. Go ahead.

Mr. MOORE. I have one more point. Thank you.

My fourth point is that locally based programs are more likely to have creative solutions to achieve water quality objectives. In addition to the NRCS approved conservation measures, we could utilize use of our State's experiment stations more effectively if we allow the use of, quote, scientifically proven innovative conservation measures, unquote, and focus more on appropriate suites of conservation measures that fit the local ecological zone and local farming practices. We have done this both in—the statement of scientifically proven innovative conservation measures was put both in the Alpine as well as the Muskingum plans that were approved by the Ohio EPA.

Thank you.

Mr. GIBBS. Thank you.

Our next witness is Mr. Carl Shaffer. He is president of the Pennsylvania Farm Bureau, I believe a farmer, too. And he is here today also on behalf of the American Farm Bureau.

Welcome.

Mr. SHAFFER. Chairman Gibbs, Ranking Member Bishop, members of the subcommittee, I want to thank you for the invitation to testify here today.

My name is Carl Shaffer. I am president of Pennsylvania Farm Bureau. I raise corn, soy beans and wheat in Columbia County, Pennsylvania. I serve on the board of directors and the Executive Committee of the American Farm Bureau Federation.

While Farm Bureau supports the concept of water quality trading, managing nutrients is complicated and any trading system must consider this. Farm Bureau has a long history of supporting market-based approaches to improving the environment. We encourage States to consider trading to help implement State water quality programs, because trading and offsets can reduce costs associated with environmental improvements.

Pennsylvania has a nutrient trading program in place, but as we can discuss further, there is a lack of demand even though farmers are generating credits. However, even with that history of support, farmers remain cautious of trading programs. The very nature of farming is growing a plant or animal for use in the food chain. The abstract idea of invisible credits is difficult for many farmers to embrace.

Trading and offset programs are and should remain creatures of State law. And effective trading programs will not occur if EPA or States impose too many barriers. There are major scientific, market, regulatory challenges to water quality trading. The Clean Water Act leaves the task of controlling water pollution largely to the States, but EPA has pressured States to adopt standards and criteria based on nutrient levels found in perfect waters. This is unrealistic. Even worse, EPA now wants to change the baseline for Pennsylvania's existing trading programs, making it more difficult to generate credits.

If properly designed and implemented, trading can help make reaching nutrient water quality standards more affordable. Trading assumes market participants have full information about the cost and effectiveness of their nutrient reduction options and can instantly, at little or no cost, get information on nutrient credit prices and quantities. However, people are faced with limited time, resources, skills and market knowledge. Complex rules and procedures can result in poor buyer or seller participation and defeat the purpose of trading in the first place.

Lastly, it is often assumed that agriculture can supply credits less expensively than other sources. Whether or not this is true depends heavily on the trading rules and procedures described previously.

Farmers are deeply concerned about the environment. We constantly take advantage of new technology and new practices and programs as they become available, to grow quality food products while protecting our natural resources.

As I hope my remarks illustrate, the concept of trading has the potential to be a useful tool. As a concept, trading can make reaching nutrient water quality standards more affordable and attainable. However, in practice, trading is not always so simple, as regulatory and cost barriers can hinder the implementation of successful trading.

Again, I want to thank you for the opportunity to provide testimony today. I would be happy to answer any questions. Thank you.

Mr. GIBBS. Thank you, Mr. Shaffer.

Our next witness is Mr. Brent Fewell. He is a partner of Troutman Sanders law firm, or LLP. I guess it is a law firm, right?

Mr. FEWELL. Right.

Mr. GIBBS. And on behalf of the National Water Quality Trading Alliance. Welcome.

Mr. FEWELL. Thank you. Chairman Gibbs, Ranking Member Bishop and members of the subcommittee, thank you for this opportunity to talk about such an important topic.

My name is Brent Fewell and I am a partner with the law firm of Troutman Sanders. I am here today representing the members of the new National Water Quality Trading Alliance, which is a

consortium of leaders with an enduring interest in environmental protection.

I personally have been involved in trading for the better part of 2 decades, both as an environmental lawyer and also as a former EPA water official. And those who know me know how passionate I am about this issue, because when done correctly, trading can accelerate the pace of environmental protection.

We are beginning to see the positive and exciting results of trading in various locations around the U.S., including, Mr. Chairman, those affecting your district. And this hearing is about meeting the goals of the Clean Water Act, and to that end, I offer a few comments.

First, we cannot expect 20th century tools to fix 21st century environmental problems. As you mentioned, Mr. Chair, the act has been critical to reducing point-to-point source—or point source pollution from end of pipe discharges. As we have heard today from the panelists, the success of point-to-point source trading has enabled us to do that in a more cost-effective manner. However, the low hanging fruit of pollution reduction has already been harvested and the remaining fruit is high in the branches and beyond reach unless we develop a new, more effective tool.

According to EPA, 50 percent of our waters are still impaired, and of those, 60 percent comes from nonpoint source pollution, those sources that are beyond the reach of the Clean Water Act. One option would be to continue to squeeze point sources for more pollution reduction or we could approach this problem in a very different manner by taking a landscape-based approach and offering incentives for sustainable and lasting solutions.

Mr. Chair, for over 200 years, we have altered, developed, paved over and re-plumbed the hydrology of our watersheds, and we are witnessing the consequences of those actions. Solving this problem, as we have discussed today, is not going to be easy, it is not going to be cheap, and poses significant challenges to communities, cities and agriculture as they continue to expand.

Mother Nature is incredibly resilient and can withstand many insults, but the cumulative impacts of the myriad and diffuse sources and inputs in these watersheds will continue to degrade water quality and our ecosystems in ways that Government alone cannot resolve, which leads me to my second point.

If we are to accelerate the pace of restoration, we must do so with tools like credit trading. It makes little sense to require a factory or sewage treatment plant to install expensive treatment equipment if we can accomplish the same goal at a fraction of the cost through trading. Some have criticized trading as a scheme to rearrange the deck chairs or simply kick the can down the road, and I say absolutely not. Trading is no panacea and it will not work everywhere, but it is a tool that enables EPA and the States to continue to apply the pressure and insist upon moving us all one watershed, by one watershed, toward the ultimate goal of cleaner water. And if we are to achieve this goal, EPA and the States, using all their regulatory authorities and tools, must continue to hold us all accountable to meet that end goal.

Over the last few decades, we have moved from a handful of pilot projects financially supported by EPA and USDA to ones that are

now self-sustaining, credible and making a difference in cleaning up our waters. As Joe Whitworth, president of Fresh Water Trust is fond of saying, we fix rivers, and indeed they are. He and his team are fixing rivers through trading, but not only are they restoring the waters required by the requirements of the act, they are doing even more by restoring riparian habitats that provide important wildlife habitat that filter nonpoint source pollution and restore the beauty of these systems. These are additional environmental benefits and social benefits that would not occur through traditional approaches.

My third and final point, Mr. Chair. Today's trading programs are smarter and better. Our investment in these markets are beginning to pay off, but there is still room for improvement. As we have heard today, we must continue to insist that these programs use best science, are transparent, and that the trades are verifiable, credible and enforceable. And that is the important role of groups like the new Water Quality Trading Network, not to be confused with the alliance, who is helping to clarify the science and promote best practices and better approaches. Regulators, too, have an important role in ensuring that these markets are working effectively to meet the end goal.

In closing, if we are to meet the goals of the Clean Water Act, Mr. Chair, we must resolve to embrace new and innovative approaches such as water quality trading. I thank you for this opportunity.

Mr. GIBBS. Thank you.

And next up, and last witness, is Ms. Ann Swanson. She is the executive director of the Chesapeake Bay Commission.

Welcome.

Ms. SWANSON. Thank you very much. Chairman Gibbs—thank you.

Chairman Gibbs and Ranking Member Bishop and the other members of this committee, I really appreciate this time to come before you to testify about the economic potential of the nutrient trading program, and very specifically to give some testimony related to our work on the Chesapeake Bay.

By way of background, because I always think it is important to put a speaker into context, the Chesapeake Bay Commission is a tristate legislative commission. We are policymakers who operate in the general assemblies of Maryland, Pennsylvania and Virginia, three of the six States and the lion's share of the watershed of the Chesapeake Bay. Our members are 15 house and senate members, as well as 3 of the members representing the Governors of the 3 States, and 3 citizen members. In total, there are 21 members spanning those 3 States of Maryland, Pennsylvania and Virginia.

The commission, in addition to pursuing legislation in all of those three States, frequently conducts indepth research to look at emerging policy issues. We tackle everything from blue crabs, to land use, to biofuels, and in 2012, the commission turned its attention to nutrient trading.

I should be clear at this point about the commission. The commission remains neutral on whether it supports or doesn't support trading programs, in that the trading programs ended up becoming either law or regulation in the States before we actually had a posi-

tion on the subject. So instead, we decided to ask two extremely fundamental questions about trading.

The first is, "what is the potential of nutrient trading to lower costs of TMDL compliance?" because, remember, in the Chesapeake region, we are operating under the largest TMDL in the country. So that was one question. Are these cost savings touted real?

The second question that we wanted to ask was, "what are the critical elements that must be included in the trading program and what are some of the constraints that have to be put in place to make a trading program acceptable to the people and the living resources in the region?"

To do this work, we turned to RTI International, an international independent nonprofit institute that provides research, development and technical services to governments and commercial clients as well. They are one of the largest economics firms in the country.

The second thing that we did that was pivotal, though, was to put together a panel of trading experts who then would guide and work with RTI. So it wasn't just an abstract economic study. It was grounded by the experts in the region.

The third thing that we did was, because we are a signatory to all the bay agreements and the commission is one of the partners of the Chesapeake Bay program, to access the huge watershed models that are a part of our region. So the land use data that we would use and couple with the economics model was very real since that data comes directly from the States.

Well, we asked and answered those two questions. The first—and I should also comment, remember, we were not advocates for trading. Half our members were actually very skeptical on the subject, the others were strong supporters. Half were Democrats, half were Republicans. Half come from rural areas, half come from urban areas.

In the end, for the first question about the potential, the answer was unequivocably, yes, even with the constraints we put onto our question. We saw that there were very significant cost savings, particularly if you included the urban sector, particularly the stormwater sector, and the cost savings could be anywhere from 49 to 79 percent.

We also tried to identify the critical elements, and there were four. They are in our testimony and in this report. Bottom line: you need a measurable, enforceable pollution cap to drive the trading programs forward. You heard about it from other people on this panel.

The second is be sure to include stormwater. Stormwater management is the most expensive thing to pay for. It is also where the greatest cost advantage can be in terms of trading.

The third is protect and never abandon local water quality. We prohibited the degradation of local water quality in favor of a distant trade, and even with those constraints, there was anywhere from a 49- to a 70-percent cost savings.

The fourth is we had a 2-to-1 trading ratio and even included a 38-percent transaction cost, 38 percent. It was one of the highest transaction costs we could find anywhere in the country. And we did that because we wanted to see if we could require significant transparency and verification. Would it still be advantageous or did

you have to throw things like transparency, verification, local water quality to the wind to make the markets work?

And our study said you don't have to, that you can require robust verification and transparency, you can protect local water quality, you can address urban areas, and it can be potentially advantageous, but the devil is in the details, and Carl Shaffer has warned of that. And the specifics of those rules are very different. We have three States with exceedingly different trading programs, all of which have significant advantages.

So in closing, I would just like to say that this report has all of these details along with 56 additional pages of information that I could never summarize in 5 minutes.

I will say that for a commission that was skeptical, we remain hopeful that there is great promise.

Thank you very much.

Mr. GIBBS. Thank you all.

And I will start with a few questions here. The first question is a common theme here, I think everybody is in agreement that this could work if it is set up right.

Ms. SWANSON. Yes.

Mr. GIBBS. I think a couple points. The voluntary aspect, instead of having a regulatory agency coming in and just, you know, with a club and a hammer, it is probably not going to work, but when we talk about credits and figuring out how much credit, you know, compared to, like, a baseline concept, I will just throw this out to anybody that wants to try to start answering, but, you know, how do you develop what the credit would be and then?

For example, you have got one farmer doing no till technology, maybe doing cover crops, and another farmer isn't and you start the program, would that farm that has been already implementing measures to protect water quality, would he get any credit, or, you know, how are we—do we establish a baseline or do we kind of figure out what has been the experience of how you start developing the program when you have got some participation, people doing the right thing or doing the thing that was more environmentally friendly than other people? You know, how do we kind of move forward to start? What has been your experience? Anybody want to tackle that?

Go ahead, Mr. Shaffer.

Mr. SHAFFER. You are absolutely right on the baseline, and this is what became one of the problems. You had a baseline and then you added on, say, no tilling would add up credits, cover cropping would add up credits, but if you have somebody that is a good steward of the land and already voluntarily doing these things, now EPA wants to try to come in and say, OK, this is the baseline after you are doing all this, therefore, to go beyond that, the only thing left is to idle ground.

Mr. GIBBS. Yeah.

Mr. SHAFFER. And that is really not acceptable to agriculture. I mean, EPA itself said in its TMDLs probably 20 percent of the watershed in the Chesapeake Bay watershed is going to have to be idled to meet these numbers. That is a tough pill to swallow. It really is.

Mr. GIBBS. But Ms. Swanson, you talked about the several different States that totally different——

Ms. SWANSON. We do.

Mr. GIBBS [continuing]. Rules.

Ms. SWANSON. We do. In the Chesapeake region, first of all, for example, let's look at Virginia. Virginia sets its baseline based on practices. There are five practices, for example, that the farmer needs to have in place if they are appropriate to that farm, and then above and beyond those practices, if a farmer can do more, then the "more" is tradable.

In Maryland, they set a performance baseline. Based on the TMDL, Maryland has done the math to figure out the per farm allocation, and if the farm is meeting that allocation, through best management practices, then if the farm reduces its pollutant load still further, that delta is tradable.

And so what you are doing is you are setting a baseline. Let us say I am a farmer that has already done a lot, a huge amount, well, then I will be at baseline. If I do more—say, I install a manure-to-energy facility or something like that, that is really getting a lot load more, then I can trade those extra credits. If I am a farmer that hasn't done a lot, well, then I have to get to baseline before I can avail myself of trading. And that is how it works, because remember, trading is about additionality. It is intended to do more and then be able to trade that "more." That is how it works in our region.

Mr. GIBBS. OK. How do you factor in what the value of the credit will be? Is there a model, or how is it—how do you—you know, anybody can—you want to take that? Go ahead.

Ms. SWANSON. Sure. In our region, we have an enormous suite of practices. Each one of those practices is then assigned an efficiency. OK? The way that we have negotiated that efficiency is all of the States and EPA work together, we consult with experts, we consult with all the scientific literature as well as edge-of-field monitoring, and we come up with an efficiency, a pound per acre, pound per practice, you know, something like that, and then we determine what that practice is worth.

So, for example, if you put a cover crop on an acre of land, there is a per acre efficiency. In our case, we must have 20 different variations on cover crops, maybe more, you know, so let us say you have a rye cover crop, and we know how far it is from the closest tributary, because there are all kinds of delivery discounters, but then you actually have a number and then you can add up the numbers. So if you have 27 acres of cover crops in a certain location, then you know exactly what that is worth.

Mr. GIBBS. OK. Before I yield to Mr. Bishop, I just have another quick question for you, I guess, Ms. Swanson.

Ms. SWANSON. Yes.

Mr. GIBBS. Since you are, as you said, operating on the largest TMDL watershed——

Ms. SWANSON. Yes.

Mr. GIBBS [continuing]. In the country and there is a lot more enforcement mechanisms in there, I guess——

Ms. SWANSON. Yes.

Mr. GIBBS [continuing]. In these others, you know, you hear about soil and water maybe being the lead agency working on the trading credits, so I am assuming that in the Chesapeake, that the EPA has been the lead agency, or who has been the lead agency or lead entity?

Ms. SWANSON. EPA has helped coordinate the Chesapeake Bay program, but the Chesapeake Bay program is made up of the six States, the Chesapeake Bay Commission and the mayor of the District of Columbia as well.

Mr. GIBBS. First of all, agriculture ground that is—who is doing the verification that these practices are being implemented on——

Ms. SWANSON. We are actually working on that right now.

Mr. GIBBS. OK.

Ms. SWANSON. In the past, we didn't have the kind of verification that is now required with the TMDL, but in general, we tend to be reaching towards our districts, for example, our soil conservation districts, the USDA, or the State department of agriculture. They have to be working closely with their water quality agency, because their water quality agency ultimately has to sign on the dotted line.

So one of the things we are doing right now is developing what is called the verification protocols, and it is a set of rules for stormwater and for agriculture and for anything basically that wants to be credited in that model, and a similar kind of verification will be required of trading. Now, I will say this: when a trade is involved, the level of verification goes up——

Mr. GIBBS. OK.

Ms. SWANSON [continuing]. A notch higher than if you are just getting credit in the model, and rightly so, because usually the purchasers are going to be permits—permitted groups like waste treatment plants or MS–4s are the buyers, so——

Mr. GIBBS. OK. That is helpful.

Mr. Bishop, I yield.

Mr. BISHOP. Thank you, Mr. Chairman. And thanks to all of you for your testimony.

One theme that sort of runs through the testimony of many of you, if not all of you, is the need for there to be a driver in order for a water quality trading market to actually function at an appropriate level, and so I have two questions and I will put it to each of you to take a crack at it.

One, is it possible to have a successful trading program in the absence of a driver? And then the second is, if the driver is not a regulatory driver, which appears to be the most common or the most likely driver, what other drivers might possibly work? So whoever wants to start.

Mr. Moore.

Mr. MOORE. Yes.

A good case would be the city of Columbus, Ohio, which has problems for its drinking water of high nitrates and treating atrazine, enormous expense involved. They don't—as far as their NPDES permit, it is not such a big issue, but it is the drinking water issue that really brings them to the table to be able to want to fund upstream activities. So that might be one example.

Mr. BISHOP. OK. Mr. Shaffer, and then Mr. Fewell, we will go to you.

Mr. SHAFFER. Yeah. The idea of a driver is a little deceiving. We have a driver in Pennsylvania. It is the TMDL's put on municipal treatment plants, but most of those municipal treatment plants were able to attain those numbers, so they don't need to do any trading. There is very few of them that really—there are some small ones now that are trading, and I have examples of farmers that are doing trading with them, but the majority of them, one, the constituents, the rate payers, they would rather see their money go towards bricks and mortar, so they want the treatment plants upgraded rather than some abstract trading.

Mr. BISHOP. But in your case, the TMDL is in fact the regulatory driver, correct?

Mr. SHAFFER. Correct.

Mr. BISHOP. OK.

Mr. SHAFFER. In my opinion.

Mr. BISHOP. Yes, yes.

OK. Mr. Fewell.

Mr. FEWELL. Yeah, Mr. Bishop, I would argue that some driver needs to be there, it could be regulatory, but it also can be a threat of a regulatory driver. And EPA under the Clean Water Act does allow watersheds and regions to do pre-TMDL strategies if there is an implementation plan.

We understand the challenge with a TMDL is EPA cannot force, there is no teeth in the TMDL for EPA. It is really at the State level for them to figure out how to achieve the goal of the TMDL.

But with the concerns and anxiety that comes along with TMDL's, if you can promise a watershed that we will hold off on a TMDL if you put in place an implementation plan for your watershed, then we will hold off on a TMDL, and so a pre-TMDL and threat of a TMDL may be enough to actually create these markets.

Mr. BISHOP. OK.

And Mr. Tennant.

Mr. TENNANT. Just need to again mention that we have reached the point that we have on the Ohio River through—without the regulatory driver. Brent might say there is some sense of an impending threat of one, but the credits that have been involved so far are based on stewardship concerns and can probably continue to some certain point, but his mention of the possibility of a pre-TMDL type of approach is very intriguing and certainly something that I think our project partners would like to think about.

Mr. BISHOP. Ms. Swanson.

Ms. SWANSON. So we worked with a very conservative economics firm, RTI International, and I want to quote, it says, "for a nutrient credit trading system to work, the first and most critical requirement is to define a measurable and enforceable cap." And in our region, of course, I have mentioned that that is the TMDL.

What we have seen is in some situations, for example with waste treatment plants, in Pennsylvania, most of the waste treatment plants have decided to just do it on their own and not trade. They don't want to trade for agricultural credits or other credits, and that is very clear. It goes back to market preference. They prefer a more predictable situation. However, what we have seen in the

region is that the MS–4s are much more interested. There is a much stronger regulatory driver there than ever before, and we are seeing that the expense of controlling a pound of urban stormwater is so prohibitively expensive, that they are reaching for trades. And if you look, for example, in Virginia, a huge number of the trades, more than 75 of the trades, have come from Department of Transportation or stormwater demands to buy credits.

The other thing that we have seen, and my colleague from the southern bay talks about this, is that waste treatment plants are trading among themselves located within a bubble permit.

Mr. BISHOP. Thank you all very much.

My time has expired.

Just at the risk of being argumentative, it seems to me that a regulation or a threat of a regulation is essentially a distinction without a difference, and it is basically the same driver.

But, Mr. Chairman, I will yield. Thank you.

Mr. GIBBS. Ms. Edwards.

Ms. EDWARDS. Thank you very much, Mr. Chairman, and thank you to the witnesses.

I have a particular question, because I have been interested in the idea, and NACWA's been very supportive of using green infrastructure techniques around stormwater management, and I am looking at the requirements and I hear Director Swanson talking about the importance of, you know, sort of where the market gets segregated when it comes to urban stormwater, and so I am trying to figure out how it is that water systems can be encouraged to use green technologies but still have the ability potentially to trade in a marketplace that is actually going to make a difference when it comes to the nutrient loads. So help me out.

Ms. SWANSON. Well, your own sewage treatment plan comes immediately to mind with Blue Plains, and Blue Plains is absolutely cutting edge when it comes to this.

They are asking, particularly in your northwestern quadrant, "How do we use green infrastructure in place of very, very substantial, for example, CSO tunnels?" They are doing that work right now.

And what they need to do is, of course, they need to find the locations where there is a very real green infrastructure advantage and then they need to be applying those efficiencies. They need to verify, then, that the load reductions are really happening.

The other thing I would caution is, for the District of Columbia to be a winner, they would always have to be looking for upstream advantage so that the river water, when it comes tumbling down, is cleaner coming into the city.

If you were putting in green infrastructure south of the city, then the citizens of the District would be a loser. And so that is really important to consider geography.

Ms. EDWARDS. And so, when you would think about creating a marketplace in which the significant point source——

Ms. SWANSON. Right.

Ms. EDWARDS [continuing]. Elements would not then—I mean, there is a part of their requirement that they can't get around.

Ms. SWANSON. Yeah.

Ms. EDWARDS. So what would then be the incentive to develop these other techniques?

Ms. SWANSON. Well, in my mind, that goes back to an enforceable cap. Because if you didn't have the District of Columbia being forced to do these kinds of upgrades, you wouldn't have the market response and you wouldn't have these conversations going on at the level of earnest that they are going on.

Ms. EDWARDS. So you don't think a trading market—and I think, Mr. Fewell, if you want to comment, you don't think a trading market would disincentivize the significant point sources from participating in the marketplace and developing new technologies——

Ms. SWANSON. No.

Ms. EDWARDS [continuing]. Or quite the opposite?

Ms. SWANSON. No.

Mr. FEWELL. Yeah. Ms. Edwards, I think there is a great opportunity and I have had some great discussions with George Hawkins about ways that DC could save money—taxpayer money.

And instead of requiring Blue Plains to put in additional treatment costs at tens, if not hundreds, of millions of dollars, give them the opportunity to use a fraction of that to go up into the watershed, to put some of these practices on farms, to reduce some of the nonpoint source pollution.

And not only will you reduce nutrients and perhaps achieve their compliance obligations much more cost-effectively, you are also going to be reducing other things, like, perhaps, you know, other, you know, contaminants that flow off of agricultural properties.

Ms. EDWARDS. Thanks.

And just a, you know, totally random question: But is there a way that you look at things like—you know, within, say, the Potomac region—if we are making greater investments in things like transit and other areas that actually then help to, you know, lower the nutrient contribution, do those things factor into the trading market?

Ms. SWANSON. In my mind, they should. And——

Ms. EDWARDS. But they don't cover——

Ms. SWANSON. Well, but they can. Remember, if you are calculating nutrients—and the chairman asked the question earlier—how do you know? How do you know what something is worth?

Well, if you think that you are doing something, say, related to transit that is reducing, say, nitrogen deposition from the atmosphere, then you need to convene a panel that can determine scientifically what that action is worth per pound of effort.

And then, once you know, it can enter into the trading market. But you have to have some scientific basis for the worth of the calculation. It can't just be made up, you know.

Ms. EDWARDS. Thanks.

And thank you, Mr. Chairman.

I mean, I would really love it if we were able to, from, you know, a study standpoint, actually take a look at connecting the way that we are thinking about water quality and some of our other responsibilities when it comes to developing our transportation infrastructure to see ways in which we can think of these things as related and that we could—I don't know whether it is a study or something else, but figure out what that calculation is, because it could pro-

vide a great incentive for this committee, but, also, a real incentive for some of our heavily polluting urban areas to think differently about their investments and infrastructure.

Mr. GIBBS. Mr. Davis, do you have any questions?

Mr. DAVIS. Thank you, Mr. Chairman.

Sorry. I got caught looking at my phone. I apologize.

Thank you very much, everyone, for your testimony. Thank you for being here today. Very important issue.

And I want to thank Chairman Gibbs for holding this hearing.

And I want to thank Ranking Member Bishop for being here. And I am still mad at him for throwing me out in the congressional baseball game last year; so, I can't be nice to him here. I will get you back this year, buddy.

Hey, you know, nobody thought we could have fun at these hearings. Right? You guys can smile. It is OK.

Mr. Shaffer, I have got a question for you. In your testimony, you note that the EPA often focuses more on assigning blame than finding solutions. I sense a real disconnect between the EPA and the ag community.

And in the Farm Bill, one of my top priorities was to give farmers a place at the table when it came to EPA regulations, and we were successful. Ag now has a voice on EPA Science Advisory Committee.

I want to know from you, sir, what else can be done to bridge the gap between the ag community and the EPA especially on the issue of water quality trading?

Mr. SHAFFER. I think, you know, I would like to turn one of Mr. Bishop's comments around. And Mr. Fewell said it, too.

Why not implement the threat of more regulation? Why not implement reducing the regulation in return for more nutrient trading, reverse that?

I think that would be a better way to go and more—definitely, from agriculture's point of view, they would have a lot more interest in that. And so that is one way to do it, that I think.

But, you know, I know a farmer who does trading with a small municipal treatment center, and he gets $40 per acre. Now, $20 is for no tilling, and $20 is for cover crop. And that barely—that doesn't cover the cost of those two practices.

But then you add on $3,000 for third-party verification. It really—it is not that lucrative of a deal. So some way we have to get better numbers in there because what they are probably saving, that small municipal treatment center, is a lot more than what they are putting out for a trading thing.

So we need to have more demand. And maybe a way to do that demand, instead of threaten more regulation, is threaten to reduce some regulation in return for more practices.

Mr. DAVIS. Well, I mean, that actually goes into my next question, that you would consider one of the barriers to the operation of the marketplace when it comes to our ag community not wanting to take advantage because the cost-benefit ratio is not working out for them, as you just said.

Do you have any examples of some other potential barriers? Or does anybody else on the panel want to address this question?

Mr. SHAFFER. Well, one other barrier, as I said, is the fact that EPA keeps moving the goalpost. And every time you think you are in a position that you could go out and do some trading, if your numbers get changed, you throw up your hands pretty quick. And that is counterproductive, very counterproductive.

Mr. DAVIS. Does anybody want to—you know what? We will go left to right.

Mr. Fewell.

Mr. FEWELL. "Fewell."

Mr. DAVIS. "Fewell."

Mr. FEWELL. Thank you.

Mr. Davis, we talked about it briefly, a little bit about baseline. Baseline can encourage trading or it can kill trading.

And if your baseline is too high and you expect your ag producers to reduce 80 percent of their runoff before they can even begin to trade, they are not going to trade. There is absolutely no incentive whatsoever.

So there does have to be a look at the baseline. That is number one.

Mr. DAVIS. OK. Thanks.

Mr. Moore.

Mr. MOORE. Yes. I would like to build on Mr. Shaffer's point, and that was how to reverse the incentive.

In Alpine Cheese, one of the conservation measures we use is called milk house waste. This is what comes out of a dairy parlor when they milk the cows, and it is a mixture of a number of things. But it goes through a pipe, usually, into a ditch or a stream directly.

EPA, when we informed them about that, wanted to fine all the farmers immediately. And we were able then to make the argument that, if it comes out of a pipe and if they are going to fine the farmers, why not be proactive and then give a better credit ratio to those same farmers.

So we actually got a 1-to-1 ratio on that. It was actually adopted by other trading plans as well, and it has been a very successful plan. So it makes your point.

Mr. DAVIS. Great. Thank you. Thank you.

Mister——

Mr. PLETL. One point I wanted to make was in regards to the concept of the trading ratio. The trading ratio, if, for example, in Virginia, is applied to the point source and nonpoint source trades—I will give you an example: If a point source like a wastewater facility needed to come up with a thousand credits or pounds of nitrogen, they would have to go to—if they wanted to go to a nonpoint source, the nonpoint source would have to remove 2,000 pounds of nutrients to be able to make that trade.

You have instantly devalued the nutrient credits that are being generated by agriculture by putting that ratio into place. And the reason that ratio is into place is because there is concerns and fears over uncertainty and measurement and verification of the credits that are generated by agriculture.

I would hold that we should go after that uncertainty, find out what it is, measure it, and stop putting these kind of arbitrary trading ratios and interfering with these trades because, when you

do things like the baseline effect and then you add the trading ratio on top of that, you will not have trading between point source and nonpoint source in Virginia.

Mr. DAVIS. Great. Thank you all very, very much for being here and for your testimony and for your educating us on a very important program.

I yield back.

Mr. GIBBS. I want to have a little discussion here. We talk about point source and nonpoint source trading and the concern—I think you just said it—the verification especially on ag. And maybe, Dr. Moore, with experience there in the Alpine Cheese project, in your working with about—I don't know—100 or so Amish farmers, I believe, how did the verification program work? Kind of go through the process a little bit.

Mr. MOORE. Sure. That was one of our roles in the program, actually, to bring different parties together to try to lower the transaction cost on the verification.

We held a meeting between Ohio EPA, Ohio Department of Natural Resources, and the Holmes County Soil and Water Conservation District.

I can remember it very vividly. It was in the Entomology Building at Ohio—at OARDC, Ohio Agricultural Research and Development Center.

What we did is we created an MOU between the Ohio EPA and the Ohio Department of Natural Resources because they already conduct a verification process for—at the soil and water conservation districts.

So there is a certain percentage of those that they go back and then resample after somebody, you know, has put in a conservation major just to verify it.

So we said, you know, "Why reinvent the wheel when you have already got a system like that?" So we were able then to get people together and create an MOU. That MOU was also used in other trading systems.

Mr. GIBBS. Yes.

Ms. SWANSON. One thing I would just caution is, at the end of the day, the nutrient credit trading program is about improving water quality. And when we did our study, what we saw is that, even with transaction costs high, the market can be robust—but you need some kind of a driver that really pushes it to that robust place—then you can require verification and still have a robust market.

In terms of the trading ratios, in our region, none of our States operate on a 1-to-1 ratio. None of them do. Not one of them.

In Virginia, we have a 2-to-1 ratio for point to nonpoint. But even in the other States, there is a 10-percent set-aside or a 10-percent retirement. So they are operating at least doing a 1.1 to 1.

And the reason is because, with nonpoint sources, there never is that same level of assuredness and, at the end of the day, it is about water quality and making sure that you are improving water quality, however incremental that may be. So just keep that in mind.

Mr. GIBBS. Yes.

Mr. FEWELL. Mr. Chair, can I also emphasize? I think, as Ms. Swanson has talked about, this is all about improving water quality, but I think the benefits that I have seen and many of us have seen with these trading programs is you are getting folks to actually work together to resolve big, complicated problems.

So when you have the agriculture community talking with watershed groups, environmental groups and municipal leaders, it is a good thing, because people are actually trying to solve big problems, they feel good about it, and it is working in many cases.

I think Peter can attest to that in the ORB.

Mr. TENNANT. Yeah. The statement I made in our project video that, once you get people sitting around the table talking about our problem instead of pointing fingers, you make progress, when we all claim ownership and say, "How can we work together to solve it?"

Mr. GIBBS. I guess, in that realm—I know, of course, Dr. Moore—you know, that Alpine Cheese project started back in the early 2000s. And I know Mr. Tennant has a project that is going off and others that have been mentioned.

Is there any policy initiatives that should be—at the Federal level that should be addressed or, you know, what hurdles have there been that we could look at, that we should look at?

Because, you know, personally—I think Mr. Bishop is, too—we want a program like this to work because we have all got the end goal as cleaner water for our water bodies across the country. And we don't want the Federal Government to be an impediment to that. But go ahead. You got the gist of my question, I guess.

Mr. FEWELL. Yeah. Mr. Chair, first of all, you know, having the lead at EPA, EPA is definitely committed to doing this, but they realize it is going to happen at the State and local level.

I think one of the biggest threats right now is perhaps zealous litigants, those that are opposed to trading that see it as an antithesis to the Clean Water Act. That is a big threat.

Now, there may be some disagreement on this panel or even in this room on whether or not we need some type of authorizing rule.

I think that that actually—in my personal view, I think that would be helpful to have that in place to protect these trading programs for doing the things that they need to do.

Mr. GIBBS. I guess, just to follow up on that, I want to ask Dr. Moore: Has Ohio set up any rules on trading rules? Has that had anything——

Mr. MOORE. We have formal trading rules in Ohio now. Uh-huh.

Mr. GIBBS. And, of course, obviously, the three States over here. Ms. Swanson does.

Pennsylvania?

Mr. SHAFFER. Yeah. We have formal trading rules. And, like I said, I still get back to everybody has to be treated fairly or it is not going to work. It has to be a win for both sides.

And if you let the States put that together without EPA interfering in it and setting guidelines and holding their gun at somebody's head, I think things are just going to work better and that is going to be——

Mr. GIBBS. This goes back to my old premise of a one-size-fits-all policy out of Washington, DC, is probably not too workable.

Virginia, The Hamptons?

Mr. PLETL. Yes. We have got rules for trading in Virginia, quite extensive. We have got statute as well as regulation and guidance.

Mr. GIBBS. OK. So my final thought on this—did I see a hand go up?

Ms. SWANSON. Yes.

Mr. GIBBS. Go ahead.

Ms. SWANSON. Just something for your own benefit, Mr. Chairman, is, in the Chesapeake—because we have three such different State programs—the EPA is now issuing a series of trading memoranda—technical memoranda—on different aspects of trading in which they are issuing guidance to try to get some level of uniformity amongst the different States.

Certain things related to baseline, offsets, and other issues are covered that that EPA is considering when evaluating trading in the context of the TMDL. So you may want to look at the suite—there is about 12 of them—of technical memoranda dealing with trading-related issues.

Mr. GIBBS. Yes, Mr. Shaffer.

Mr. SHAFFER. You hit the nail on the head when you said one size doesn't fit all. The topography in Pennsylvania is entirely different than the topography in Maryland or Virginia or Ohio. So that is why you have to have the States have the affordability of designing their own programs.

Mr. GIBBS. And I am in agreement. I think the challenge is when you have watersheds that go across State lines. And, you know, we had some of that with acid rain, I think, years ago, you know, that discussion.

So a broad set of parameters might make some sense as long as it doesn't get too much into details unless States give much flexibility.

We have been trying to do some of that in some other areas in this committee, you know, the relationship between the U.S. EPA and State EPAs and how they implement the Clean Water Act, in general.

And it is a challenge that, you know, needs worked on, but, you know, I just think that, you know, the States can adopt policies.

And the other final thought, you know, for this thing to work the way it really needs to work, especially when you are trying to address the nonpoint sources, you know, the voluntary aspect, you have got a real unique situation, I think, in the—with your TMDL issue.

But a lot of watersheds aren't at that point yet where they can do some things like what was commented earlier, that they head off a regulatory hammer and address that and—because, you know, the people in the agricultural sector and other sectors, you know, want to do the right thing.

And, you know, our Alpine Cheese is a great example where we had a plant that wanted to expand. You know, without doing this, they were going to have to leave, close it down. And we cleaned up the watershed and we kept the milk producers, dairy farmers, with a market. And so it was a win-win.

So this can be done in a way that it is a win-win situation, but you have got to have some common sense and make some sense.

But it has been great hearing from all of you today.

And I don't know if Mr. Bishop——

Mr. BISHOP. If I could, Mr. Chairman.

Mr. GIBBS. Yeah. Go ahead.

Mr. BISHOP. Just real quick, I think a very important point that has been made is the goal here is the net improvement in the overall quality of the water body.

And that suggests that two pieces of this process require very careful attention. One is verification, that is to say, that the credit that is being purchased actually exists. And then the second is the issue of ratios, as to whether or not a quantity, if you will, of a nutrient at point source is the same as the quality of a nutrient—or quantity—pardon me—further away from the body of water that you are trying to protect.

And so I guess my question—and I would ask that whoever answers it to be exceedingly brief—is: Are the mechanisms that we currently have in place to deal with verification and ratios—and I know they differ from State to State—but are those mechanisms adequate or is there some improvement that can be undertaken either by the States or with some incentive from the Feds?

Yeah, Mr. Shaffer.

Mr. SHAFFER. One idea I think would be good is to involve the soil and water conservation districts and have them as part of the verification process, because they already work with the components and it could be where you could pay them a nominal fee to have them do the verification instead of a third party that is charging an exorbitant fee. So that is just an idea.

Thank you.

Mr. GIBBS. That is exactly what happened in the Alpine Cheese example. Some water got involved because of the culture—the Amish culture.

Having people from Chicago or Washington, DC, come out to the farms probably wasn't too amenable and they didn't have the working relationship and that there was a trust factor there.

So I think for this to really work, the local, certainly, water people need to be really the facilitators in the agricultural sector.

Mr. MOORE. Exactly. And just to follow up on that, initially, the Ohio EPA had asked if they could do the verifying, and that is when we had the MOU.

But, in addition to that, Soil and Water does go out to the farms, and that is acceptable to the farming community because of that high level of trust.

Mr. BISHOP. Dr. Pletl.

Mr. PLETL. One thing to consider is, when we do TMDLs—and that, you know, tends to be the regulatory driver—there is a lot of focus on the front end of doing all the calculations and coming up with, "OK. The point sources are going to get this load, and the nonpoint sources are going to get these loads."

But, at that point, the discussion that includes all the parties kind of stops. All of a sudden the point sources know what they are supposed to do, and the nonpoint sources now are under the gun to do things that they, you know, are not prepared to do.

I would argue that that process of working together on what the TMDLs should look like should continue. There should be an open

discussion of all the members on a watershed of how the best—what is the best approach to removing nutrients from that watershed and what is the best way to do it, but at the lowest cost.

So I think the way that we go about addressing TMDLs is a bit outdated and we need to start thinking about more of a community-based approach to addressing these problems instead of "we," "they," and all it does is cause a lot of this between the parties.

Mr. TENNANT. I am in total agreement with what has been said about the verification aspect. I wanted to just say something about the ratios.

In our Ohio River Basin project, we are relying on a water quality model that allows us to equate what is a pound of nitrogen removed in Columbus on the Scioto River, how does that relate to a pound of nitrogen removal required at Cincinnati downstream on the Ohio River.

We have that model up and running for about 50 percent of the watershed, including pretty much all of the State of Ohio. Where we have that in place gives us some degree of certainty about the equivalency of the two sides of the trade. We need to extend that model to the rest of our watershed in order to be able to go basinwide to include all of our Ohio River watershed.

Mr. BISHOP. Ms. Swanson.

Ms. SWANSON. At the expense of bringing up something that might be a little bit uncomfortable, you need to consider transparency. All of our States have had to do this since confidentiality has traditionally been extended to farmers.

However, in the situation of a trade, we have had to rethink that to determine whether, in cases where a point source of some type is buying credits from a farm, did those practices need to be more fully disclosed.

And so, as you pursue trading programs in other areas, keep that in mind, because the general public is going to want to know how those trades occurred and what are they trading for. Issues of farm confidentiality do come up.

Mr. BISHOP. OK. All right.

I am sorry. Dr. Moore.

Mr. MOORE. Yes. I have one thing I would just like you to consider, and that is the TMDLs are normally calculated based on normal summer flows, is typical.

I mean, they bring other things into consideration, but one thing that seems to be quite missing in the analysis are rain events.

Mr. BISHOP. I am sorry. Are——

Mr. MOORE. Rain events or, you know, big storms.

And most of the phosphorous and nitrogen is actually exported during those really big rain events, as any farmer knows, as they have seen their soil wash away.

So, you know, that is something that needs to be addressed, and I don't think we have addressed it enough.

Mr. BISHOP. OK. All right. Thank you all very, very much. It has been a very helpful hearing. Thank you.

Mr. GIBBS. Thank you, too.

And I want to thank you all for coming in. It has been helpful.

And before we close here, I would ask unanimous consent that the hearing record be kept open for 30 days after this hearing in

order to accept other submissions of written testimony for the hearing record.

Without objection, so ordered.

And, again, thank you. And that concludes today's hearing.

[Whereupon, at 4:46 p.m. The subcommittee was adjourned.]

5735 Kellogg Avenue
Cincinnati, Ohio 45230
513-231-7719
www.orsanco.org

Association of Clean Water Administrators
1221 Connecticut Avenue, N.W. 2nd Floor
Washington, DC 20036
202-756-0600
www.acwa-us.org

March 25, 2013

Testimony of Peter A. Tennant, P.E.

Executive Director, Ohio River Valley Water Sanitation Commission (ORSANCO)

United States House of Representatives

Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

Regarding

The Role of Trading in Achieving Water Quality Objectives

Good afternoon, Chairman Gibbs, Ranking Member Bishop, and Members of the Subcommittee, My name is Peter Tennant; I am the Executive Director of the Ohio River Valley Water Sanitation Commission, commonly known as ORSANCO. ORSANCO is an interstate commission that carries out a compact signed by eight states – Illinois, Indiana, Kentucky, New York, Ohio, Pennsylvania, Virginia and West Virginia – with approval by the United States Congress and participation by the federal government. Since its inception in 1948, ORSANCO has worked with its member states and appropriate federal agencies to improve and protect the water quality of the waters of the Ohio River Basin. I am also a member of the Association of Clean Water Administrators and currently serve as the chair of ACWA's State, Regional and Other NPDES Issues Work Group.

Many successes have been achieved in restoring the water quality of the Ohio River and its tributaries. All of those successes have been achieved through collaboration among states, federal agencies, local utilities, industries, and others. ORSANCO has benefitted from outstanding partnerships that cross boundaries to pursue a shared mission to keep our waters clean.

As with other waters in the US, the emphasis in the Ohio River Basin for the first few decades of ORSANCO's existence was on achieving adequate treatment of sewage and industrial wastes. As the goals regarding waste treatment were reached, however, we learned that there were other problems that needed to be addressed. Runoff from city streets and from farmland carried certain pollutants that led to problems in the receiving waters. This type of pollution did not lend itself to the collect and treat approaches that had worked for sewage and industrial waste. New approaches were clearly needed.

In 1997, the Mississippi River – Gulf of Mexico Watershed Nutrient Task Force was established to address a zone of hypoxia – frequently referred to as a dead zone – in the northern Gulf of Mexico. That problem is caused by nutrients that are transported to the Gulf by the Mississippi and Atchafalaya Rivers. Since the Ohio River contributes a significant portion of the nutrient loading to the Mississippi River, it was necessary for nutrient reduction efforts to include the Ohio River Basin. One approach to nutrient reduction that was identified was water quality trading. In 2003, a report by the World Resources Institute identified the Ohio River Basin as a sub basin of the Mississippi in which trading might be successfully applied.

The basic concept of water quality trading is that where two sources of a pollutant have very different costs to reduce that pollutant, the source with the higher reduction cost might pay the source with the lower cost to provide additional reduction. In the case of nutrients, treatment to reduce levels in sewage and industrial waste can be expensive, whereas reduction of levels in runoff from farms can be achieved at lower cost through best management practices. In order for the concept to work, there has to be a mix of source types such that loadings from those with lower removal costs (referred to as credit sellers) are equal to or exceed loadings from those with higher costs (credit buyers). The Ohio River Basin was singled out as a potential site for trading in large part because of the ratio of sellers to buyers.

One of the services that ORSANCO provides to its member states is to provide a platform for trying out new approaches. Over the years a number of methods for monitoring water quality, treating wastewater, analyzing water samples, and communicating results have been field tested on the Ohio River. Water quality trading was first brought to the Commission's attention in 2001. Trading programs were being discussed in the Chesapeake Bay watershed; Pennsylvania and Virginia are member states of ORSANCO that also lie partially within the Bay watershed and were part of those discussions. Ohio was investigating

the use of trading as part of watershed management approaches. When the use of trading on a large scale, interstate basis in the Ohio River Basin was proposed, it was agreed by the member states that ORSANCO would investigate this potential tool and its use in reducing nutrient loadings. A series of meetings were held in 2003 through 2005 involving state and federal environmental, agricultural and conservation agencies. While interest in water quality trading was evident, action toward establishing a basin-wide program was stymied by the lack of a driver. Efforts to develop numerical nutrient criteria for the Mississippi River and its tributaries have been unsuccessful to date. The lack of numeric criteria means that nutrient limits are not included in dischargers' NPDES permits, and they therefore do not have a regulatory incentive to reduce their loads.

Meanwhile, the Electric Power Research Institute (EPRI) was also looking into trading as a possible means for its member utilities to address future nutrient reduction requirements. In 2007, EPRI approached ORSANCO as a potential collaborator in the development of an interstate water quality trading program for the Ohio River Basin. The member states of ORSANCO were impressed by the project envisioned by EPRI, as well as the project team that had been assembled, and agreed to participate. The project team currently includes:

- American Farmland Trust
- Electric Power Research Institute
- Troutman Sanders, LLP
- Markit Environmental Registry
- Ohio Farm Bureau
- Ohio River Valley Water Sanitation Commission
- University of California at Santa Barbara

I encourage you to visit the project web site – www.wqt.epri.com – to find more information on the project. Suffice it to say that the approach to this project has been extremely thorough and that all aspects have been carefully planned, extensively discussed and carried out collaboratively. In 2012, the project reached a milestone when the directors of state environmental and agricultural agencies for the states of Indiana, Kentucky and Ohio signed a plan to carry out pilot trades among nutrient generators in the three states. Earlier this month, the first pilot trades were announced at an event in Cincinnati. Three electric

utilities – American Electric Power, Duke Energy, and Hoosier Energy – purchased 9000 nutrient credits. Those credits were purchased on a stewardship basis; the companies have agreed to retire the associated nutrient and ecosystem benefits.

We at ORSANCO are very encouraged by the progress made through this project. It appears to be a win-win situation for the participants. For the point source discharger, trading can present a lower cost alternative to treatment for nutrient reduction. For a farmer, trading can mean a new source of revenue, enabling the farm to operate more efficiently. Other speakers will provide more on the perspective of point sources and agriculture; I would like to focus the remainder of my remarks on the benefits of the trading project to the participating states and to ORSANCO.

The most obvious benefit of the trading project is the attainment of nutrient reduction at a reduced cost. A colleague of mine has estimated that the reductions represented by the credits purchased in these transactions are equivalent to the elimination of nutrient discharges from two medium size municipalities. This reduction is certainly a benefit to the environment, and its achievement at a reduced cost is a benefit to our overall effort to reduce nutrient. Perhaps less obvious is the benefit that the trading project provides through this pilot phase as an opportunity to evaluate the use of trading, to work through the inevitable challenges that come with trying something new, and to do this ahead of regulatory requirements.

I mentioned earlier that efforts to develop numerical nutrient criteria for the Mississippi River have been unsuccessful to date. ORSANCO has been tasked by its member states to develop numerical nutrient criteria for the Ohio River. For over ten years we have carried out one of the most intensive monitoring programs for algae, nutrients and associate parameters in the US, but we have yet to "crack the code" that would allow us to derive numerical criteria from the monitoring data. We anticipate that, at some point, we will be successful in developing nutrient criteria – or perhaps nutrient reduction limits for the Mississippi River or the Gulf of Mexico will be adopted, which might then be translated upstream into reduction targets for the Ohio River. At any rate, if and when regulatory requirements for nutrient reduction are adopted, we will be in a much better position to address them thanks to the experience of the trading project.

While the participants in the pilot trades include the states of Indiana, Kentucky and Ohio, the beneficiaries of the demonstrations include all of the member states of ORSANCO. In addition, through our participation in the national discussion on trading, we can share lessons learned with colleagues throughout the US. I have learned through active involvement with the Association of Clean Water Agencies that certain basic aspects of pollution abatement can apply in all parts of the country, but that approaches toward their application often need to be tailored to fit the local situation. The exchange of information with states who are involved with trading programs in other parts of the country has been very helpful to me, and I hope that our Ohio Valley experiences have provided useful examples to others.

One of the greatest benefits of this project to me has been the opportunity to work with a new set of partners who share common goals of improving the environment while delivering essential goods and services. Collectively, the participants in our project provide food, water and energy to citizens of the Ohio Valley and beyond. I commend the leadership of EPRI and our project director Jessica Fox for bringing us together.

Mr. Chairman, Members of the Subcommittee, I thank you for this opportunity to share some thoughts on the role of trading in achieving water quality objectives.

NACWA
A Clear Commitment to America's Waters

Testimony of:

James J. Pletl, Ph.D.

Director of Water Quality
Hampton Roads Sanitation District
Virginia Beach, VA

Vice Chair, Water Quality Committee
National Association of Clean Water Agencies
1816 Jefferson Place, NW
Washington, DC

The Role of Water Quality Trading in Achieving Water Quality Objectives

Transportation and Infrastructure Committee
Subcommittee on Water Resources and the Environment
U.S. House of Representatives
March 25, 2014

Introduction

Chairman Gibbs, Ranking Member Bishop, and members of the Subcommittee, thank you for the opportunity to appear before you today. My name is Jim Pletl and I am the Director of Water Quality for the Hampton Roads Sanitation District (HRSD) in Virginia Beach, Virginia. I am proud to have the opportunity to share with you my unique experience and insights on water quality trading based on my role in supporting HRSD's compliance with its National Pollution Discharge Elimination System (NPDES) permit limits for nitrogen and phosphorous.

More than 70 years ago, voters took the bold step to address pollution in the Hampton Roads region by approving a referendum creating the Virginia state-enabled Hampton Roads Sanitation District (HRSD). That public approval capped a 15-year grassroots campaign that began when shell-fishing beds in Hampton Roads were closed by the Virginia Department of Health. At the time, over 30 million gallons of untreated sewage was being discharged into the waters of the Hampton Roads each day. 32 years later, the U.S. Congress tackled the issue of water pollution on a national scale, finally passing the Clean Water Act (CWA) in 1972.

Nearly 75 years later, HRSD has developed into one of the premier wastewater treatment organizations in the nation. With 13 treatment plants capable of treating 249 million gallons of wastewater each day and serving a population of over 1.6 million people, HRSD has eliminated the daily discharge of untreated sewage into the waters of Hampton Roads from the homes and businesses within our region.

I have been fortunate enough to work with HRSD for nearly 25 years now, addressing numerous and varied water quality, air and solid waste environmental issues where compliance with state and federal regulations and statute is required. The issues have ranged from the reliability of laboratory procedures to data integrity determinations to wastewater treatment plant performance to evaluating aquatic life condition instream given multiple stressors to the establishment environmental standards like water quality criteria to the latest environmental challenges including emerging contaminants and green-house gas emissions. I have represented Publically Owned Treatment Work (POTW) organizations within Virginia and nationally throughout this career.

I also serve as the Water Quality Committee Vice-Chair for the National Association of Clean Water Agencies (NACWA), which represents the interests of more than 350 municipally owned wastewater treatment agencies and organizations that collectively treat and reclaim the majority of the wastewater generated across the Nation. Like HRSD, NACWA's members are public servants working each and every day to meet the objectives of the CWA. It is my pleasure to testify on NACWA's behalf today as well as on behalf of the 17 cities and counties in southeast Virginia which HRSD serves.

The Infrastructure Challenge

Since passage of the CWA in 1972, the estimated investment in the Nation's wastewater infrastructure totals $1.4 trillion. While successes to date under the Act have been impressive and a majority of waters

that once were impaired now meet water quality standards, data over the past several years suggest that we may have hit a plateau in terms of water quality gains and that the gains made to date may be at risk absent additional investment.

The U.S. Environmental Protection Agency (EPA) estimates repairing, replacing, and upgrading aging wastewater infrastructure will cost between $300 billion to $1 trillion over the next 20 years. Municipalities currently shoulder approximately 97% of the cost of clean water infrastructure projects, and face an immediate backlog of over $40 billion. Clean water utilities have raised rates by more than double the rate of inflation over the last decade to meet their current clean water challenges and existing debt obligations. Today 40% of households across America are already paying more out of their disposable incomes for wastewater management than EPA says is affordable.

In addition to this growing investment need EPA regulations on wet weather-related discharges, biosolids management, and nutrients under the 1972 Clean Water Act (CWA) have expanded, leading to more expensive levels of wastewater treatment. Given the current economic environment and federal budget shortfall publicly owned treatment works (POTWs) are struggling to make the necessary upgrades to protect public health and the environment without going bankrupt or increasing rates as well as their debt loads to unsustainable levels.

The Nutrient Challenge

Excessive amounts of nutrients, primarily nitrogen and phosphorous, in waterways is one of the largest pollution problems facing our nation's waters. The States have reported that many of the nation's lakes, streams, rivers and bays are moderately to severely degraded by nutrient pollution. Excess nutrients have been identified as contributing to algal blooms, fish kills, and shellfish poisonings around the country.

Effluent discharges from POTWs are one of many contributors to nutrient pollution in surface waters. Because they can be regulated through NPDES permits under the CWA, EPA has increased its focus on controlling nutrient discharges from these sources. However, it is important to recognize that POTWs are not the only, nor always the greatest, source of nutrient pollution in many waterways. Runoff from agricultural land, rich in nutrients from fertilizer and livestock manure, is often responsible for the majority of nutrient pollution. Nevertheless, here in the Chesapeake Bay watershed, where excessive amounts of nutrients in rivers and streams are contributing to low dissolved oxygen conditions; the reduction of nutrient loadings in HRSD's effluent has been a high priority.

In association with development of the Chesapeake Bay Nutrient and Sediment Total Maximum Daily Load (TMDL), in 2006, Virginia established nutrient discharge limits for all wastewater facilities that discharge within the state and to the Chesapeake Bay watershed. This TMDL, which affected all of HRSD's wastewater treatment plants, was the catalyst for the largest capital improvement program in HRSD's history. In less than five years HRSD developed a comprehensive nutrient reduction strategy that included the upgraded design of five treatment plants. HRSD was required to meet the new strict

nutrient discharge limits beginning in 2011 and has met those requirements in every instance since the requirement began.

Traditionally, utilities have relied on technology controls and upgrades to reduce their nutrient loadings at the end of pipe. Though technology fixes can be effective, they are often extremely expensive. For example, HRSD is currently upgrading a 30 MGD facility to meet the Chesapeake Bay TMDL requirements for nitrogen and phosphorous at a capital cost of $129 million dollars. HRSD will spend over $375 million dollars to meet the Bay TMDL requirements through 2017 and even more upgrades may be required when the TMDL is revisited in 2017.

Another factor to consider is that the law of diminishing returns applies to the cost of reducing nutrients as higher levels of performance are required. The cost of upgrading a facility without nitrogen removal technology, per pound of nitrogen removed, has proven to be three times less expensive than upgrading a facility that already has some of this technology but must now perform at a higher level and remove more nitrogen.

The situation for POTWs is further complicated because the technology to remove nitrogen and some phosphorous is biological rather than chemical or mechanical. The uncertainty of biological systems requires a more conservative approach to design, which increases the costs. One must also consider that the cost to upgrade a facility to meet nutrient discharge limits will be a function of the current plant design. Therefore, the cost to upgrade a facility will be facility-specific. Given costs of this magnitude and the associated issues many utilities must look at alternative ways to meet nutrient discharge requirements.

The Case for Nutrient Trading

Since 2011, HRSD's compliance with nutrient discharge permits was accomplished with expensive plant upgrades but upgrades were not required at every HRSD facility because nutrient trading between facilities was supported through regulation in Virginia. In 2005, the Virginia General Assembly authorized the concept of nutrient (total nitrogen and total phosphorous) trading and also allowed for the creation of an organization to facilitate the trading. Through the Virginia Association of Municipal Wastewater Agencies (VAMWA), POTW managers came together to establish the Virginia Nutrient Credit Exchange Association, which in-turn created the framework for nutrient credit trading between wastewater facilities, both public and private. The Virginia Nutrient Credit Exchange Association now represents 53 public/municipal and 19 private/industrial plant owners operating 105 wastewater plants from throughout Virginia.

Nutrient trading has enabled nutrient-limit compliance at all HRSD facilities at a greatly reduced cost. This is due to the ability to balance deficits and surpluses in nutrient discharges, relative to permit limits, across facilities. Trading in Virginia is based on the concept of the nutrient credit. Nutrient credits are simply a representation of the pounds of nutrients removed from a wastewater discharge beyond that required by permit. For example, if a plant has an annual limit of 1000 pounds of nitrogen that can be

discharged and it actually discharges 800 pounds in one year that plant has generated 200 pounds of nitrogen credits. These credits can be applied to other facilities with nitrogen load limits within the same water segment or downstream of that segment, allowing those other facilities to comply with their respective limits without expending a proportional amount of resources. To further illustrate the example, if another facility has a limit of 1200 pounds of nitrogen but discharges 1300 pounds it can apply part or all of the 200 pound credit generated by the first facility in my example to balance the excess 100 pounds discharged. Another way of demonstrating the concept is that as long as the total pounds discharged for the two facilities (in this case it is 2100 pounds) is equal to or less than the total of the load limits for both facilities (2200 pounds) then both facilities are in compliance with their respective limits.

This approach provides the same environmental result at a significantly lower cost because the second facility in this example did not have to install new technology to meet its permit limits. Additionally, the concept of trading has allowed HRSD to select and upgrade the facilities that will provide the greatest amount of nutrient removal at the lowest cost. This would not be possible if trading was not available; all plants would otherwise require technology upgrades and some of those upgrades would not be cost effective compared to others. The concept of nutrient trading has saved the residents of Hampton Roads hundreds of millions of dollars in wastewater plant upgrades without compromising attainment of goals established to attain water quality standards.

HRSD currently trades nitrogen and phosphorous credits, on an annual load basis, amongst its 13 facilities across three different watersheds of the Chesapeake Bay. One of the most significant cost saving trades for HRSD occurs on the Rappahannock River where its Urbanna plant obtains credits from other permitted facilities on this river in order to comply with its permit limits. The Urbanna plant would only be able to meet its nutrient permit limits with a technology upgrade or through a trade. HRSD is planning to replace the Urbanna facility and the cost of this replacement effort, which will meet all permit limits, will likely approach $10 million dollars or more even though the current design flow of the plant is only 0.05 MGD. The cost per pound of nutrient removed here will be extremely high compared to that of other HRSD facilities. The inability to trade nutrient credits on the Rappahannock River would cost HRSD's customers millions of dollars for very little nutrient benefit.

Despite the availability of nutrient trading, over 2 billion dollars of public and utility customer funds are being invested in Virginia to upgrade many of the public/municipal wastewater treatment plants. This investment would have been significantly higher without trading because every facility did not require a treatment technology upgrade with trading available. I estimate the cost to HRSD's customers would have been twice to three times the cost so far realized without the ability to trade between facilities. Water quality trading of nutrient credits has allowed all Association members to meet their respective goals without upgrading every facility, saving citizens of the Commonwealth hundreds of millions of dollars while supporting compliance with regulatory and watershed goals.

Trading is particularly important given that factors such as replacement of aging infrastructure and compliance with Federal and State mandates to reduce sanitary sewer overflows as well as new Clean

Air Act requirements are requiring HRSD to pursue an aggressive capital improvement program that will expend $1.1 billion dollars over the next 10 years. Continual rate increases are necessary to support this investment level despite best efforts to control annual operational costs.

Complicating the financial forecast is a continued decrease in per capita water consumption in Hampton Roads and other parts of the nation. Water conservation efforts over the past decade have taken hold and a definitive trend of decreasing water demand year to year has emerged. HRSD's primary revenue source is wastewater treatment as measured by water used by each account holder. Despite the nearly full reliance on this variable revenue source, HRSD's actual costs are nearly fully fixed and do not vary significantly with consumption. Due to the high percentage of fixed costs, HRSD's costs do not decrease in proportion to the reduction of revenue resulting from reduced water consumption. In order to compensate for the declining consumption unit prices (rates) must increase to fully cover the fixed costs that are spread across fewer units sold (hundred cubic feet of wastewater treated). All of these factors, in addition to nutrient removal requirements, increase the cost of treating wastewater and the cost to the residents of Hampton Roads. Trading is critical because it has the capability of reducing these costs without reducing environmental expectations.

Trading with Non-Permitted Sectors

HRSD's experience with water quality nutrient trading has been limited to activities with other permitted discharges; trades with the non-permitted sectors have not yet been realized in Virginia. Virginia regulation and the Virginia Nutrient Credit Exchange Association have largely eliminated roadblocks to trading for the NPDES permitted sector. However, trading with the non-permitted sectors like crop agriculture has been found to be somewhat problematic due primarily to the uncertainty in estimating, measuring and controlling the discharges from these sectors. To address this uncertainty, States often put in place requirements that must be met before a trade with these sectors can take place; these requirements do not apply to permitted discharges. For example, dischargers in non-permitted sectors must achieve their respective load goals before they can trade. This is often referred to as a baseline requirement. Since funding to mitigate the non-permitted discharges is usually not available and these sectors are often not required to mitigate the discharges as part of a permit system it is not likely that these sectors will meet their goals in the near future and trading cannot occur.

Another example where states address uncertainty with non-permitted sector trading is the application of a trading ratio. The trading ratio directly reduces the incentive to trade with the non-permitted sector because it reduces the value of the non-permitted sector credits. A trading ratio of 2 will be used in Virginia; this reduces the value of non-permitted sector credits by 50 percent. If a permitted entity in Virginia wishes to obtain 1000 nutrient pounds of credit from a member of the non-permitted sector the non-permitted sector member must remove 2000 nutrient pounds of credit from its discharge, beyond its discharge goal, before the trade will be approved. Requirements to meet a baseline goal prior to trading and artificially inflated trading ratios for non-permitted sector dischargers act as strong disincentives to trading and will prevent attainment of watershed goals.

Conclusion

Forty years after the passage of the CWA around the country like HRSD are transforming the way they deliver clean water services. They are becoming Utilities of the Future focused on doing more with less and bringing maximum value to their ratepayers and communities. At the heart of this transformation are innovative, market-based approaches, like water quality trading, that can stretch ratepayer dollars, improve the environment, create jobs, and stimulate the economy.

But utilities cannot master this transformation alone. They need the support of Congress which should promote greater adoption of watershed-based solutions by explicitly encouraging trading in the CWA. Similarly EPA should work with delegated states to promote viable and flexible trading programs. Doing so will give utilities the green light to engage in more nutrient transactions that can yield tangible water quality improvements while addressing the affordability concerns of POTWs and stormwater utilities around the country.

Thank you for the opportunity to appear before you today, I look forward to addressing any questions the Committee may have regarding my testimony.

STATEMENT OF RICHARD H. MOORE
EXECUTIVE DIRECTOR
ENVIRONMENTAL SCIENCES NETWORK
THE OHIO STATE UNIVERSITY

BEFORE THE
WATER RESOURCES AND ENVIRONMENT SUBCOMMITTEE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES
ON

THE ROLE OF TRADING IN ACHIEVING WATER QUALITY OBJECTIVES

March 25, 2014

STATEMENT OF RICHARD H. MOORE
EXECUTIVE DIRECTOR
ENVIRONMENTAL SCIENCES NETWORK
THE OHIO STATE UNIVERSITY

BEFORE THE
WATER RESOURCES AND ENVIRONMENT SUBCOMMITTEE
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE
UNITED STATES HOUSE OF REPRESENTATIVES
ON
THE ROLE OF TRADING IN ACHIEVING
WATER QUALITY OBJECTIVES

March 25, 2014

I am Richard H. Moore, executive director of the Environmental Sciences Network and associate director of academics for the Office of Energy and the Environment at The Ohio State University (OSU). I am also a professor in the School of Environment and Natural Resources. However, the views provided are my own, and I am not testifying on behalf of The Ohio State University.

Thank you for inviting me here today. I have been asked to provide the context of the Alpine and Muskingum water quality trading programs in Ohio.

I will begin by describing these trading systems, followed by lessons learned that serve as recommendations for the future of water quality trading programs. I'll conclude with a restatement of these recommendations, but in short, they are:

1). The water quality trading programs in Ohio and perhaps nationally should focus on minor (rather than large-scale) NPDES permit holders.
2). Community-based water quality trading programs at either the HUC 8 level or county level provide benefits over larger-scaled programs.
3). Trading should focus on areas of most impact: headwaters and critical source areas.
4). Locally based programs are likely to have creative solutions to achieve water quality objectives.

The Alpine Cheese Nutrient Trading Plan is a water quality trading example of a point source cheese company paying non point source farmers to install conservation measures in return for receiving credit on its NPDES pollution permit. It is one of approximately 24 active water-quality-trading programs in the United States (Willamette Partnership, 2012) although the actual figure may be fewer if we consider whether or not they are truly functioning in tandem with the NPDES system. The Alpine Plan was the first trading plan in the State of Ohio that served as part of a fully functioning NDPES permit. The success of the Alpine Plan led to the creation of the Muskingum River Watershed Quality Trading Plan in 2011 which has become one of the larger trading plans in the country to be described later in this testimony.

The Alpine Plan was part of the overall Sugar Creek Project headed by a team of researchers at the Ohio Agricultural Research and Development Center (OARDC) at The Ohio State University who teamed up with local agencies such as the Soil and Water Conservation Districts (SWCDs). This project started in 2000 when the Ohio Environmental Protection Agency (OEPA) labeled

the Sugar Creek Watershed the second most impaired watershed in Ohio (second only to the Cuyahoga River, which burned in 1969). Over 20 researchers from OARDC teamed up with several local farmer groups throughout the Sugar Creek Watershed to learn together about watersheds and water quality. At the suggestion of the farmers who questioned the validity of data from the Technical Support Document collected in preparation for the Sugar Creek total maximum daily loads (TMDL), researchers at OARDC tested water quality at the suggestion of the farmers at a high density of 1 sampling site per 1-2 square miles every other week throughout the watershed. It has been through the teamwork of researchers and farmers along with a close relationship with Soil and Water Conservation Districts (SWCDs) in Holmes, Wayne, and Tuscarawas Counties, that the initiative and self-reliance forming the "Sugar Creek Method" for pollution remediation emerged. The "Sugar Creek Method" is a community-based approach to watershed management that emphasizes local action and decision-making based on scientific data. It has six main characteristics: 1). Treat each stream as unique physically, biologically, and socially. 2). Focus on headwaters and benchmark water quality. 3). Catalyze participatory learning communities at the local level that seek their own sub-watershed visions. 4). Collaborate with downstream teams with the help of Extension and Soil and Water Quality professionals. 5). Build on the concept that a healthy environment leads to healthy people and profitable agriculture. 6). Seek to find more sustainable approaches at the family, property parcel, sub-watershed, community, and watershed levels through a holistic approach.

In 2005, the Alpine Cheese Company, based in the Sugar Creek watershed in Wayne County, Ohio, came to my group at the OARDC with a problem. Their business was successful enough that they needed to expand their operation, but they were facing multi-million dollar technology upgrades in order to bring the wastewater from an expanded processing system into compliance with OEPA regulations. Although by this time water quality in the Sugar Creek was improving, OEPA was not willing to green-light Alpine's expansion without pollution reduction provisions. OEPA suggested that Alpine do a partial facility upgrade and look to water quality trading to reduce its concentration to the permit goal of 1 mg phosphorus per liter of water (1 mg/L).

What we at OARDC helped to do was to create the spark to get various groups talking—Alpine Cheese Company, Ohio EPA, the Holmes County SWCD, and most importantly the farmers—to figure out how reducing non-point source pollution in the region could be coupled with cleaning up Alpine's waste stream. To this end, the SWCD and OSU partnered with Alpine and a group of 25 farmers in the area by which Alpine paid $800,000 over 5 years to support the implementation of a list of farm conservation measures. These conservation practices were in many cases quite straightforward— fencing off cattle from the streams, managing manure, and so forth—so putting them in place cost Alpine much less than the funds needed to upgrade their wastewater treatment technology. Our research and extension group then acted as an impartial body to monitor the streams in the area and determine changes.

The plan set up a trading ratio (the Ohio ratio between non point source and point source is 3:1), meaning that for every three pounds of phosphorus remediated by conservation practices upstream the permit holder downstream will get credit for one pound. In the end, the ratio was more like 2:1 because we received 1:1 credits for capturing milk house waste that had an outflow directly through a pipe into the ditch or stream so was treated as a point source. Point sources in Ohio can trade on a 1:1 basis if the one upstream remediates below the NPDES permit limit. We achieved our five-year reduction goal (5500 lbs of phosphorus) in three years, and by year five the actual amount of phosphorus remediated was 7133 lbs.

Water quality in the region improved in more than just nutrient load. By the end of the first five-year NPDES permit cycle, biological indicators in the Middle Fork of Sugar Creek, located just

downstream from the cheese factory outflow, went from "Partially Impaired" to "Full Attainment" status as independently evaluated by the Midwest Biodiversity Institute report of late 2010. Due to the success of the first five years, the plan NPDES permit was renewed in 2012.

But the real success was the collaboration between all of the partners—the Holmes, Wayne and Tuscarawas County SWCDs, the Ohio Environmental Protection Agency, the Alpine Cheese Company, the Ohio Department of Natural Resources, Ohio Farm Bureau, Ohio Department of Agriculture, USDA–NRCS and of course, the farmers many of whom were Amish and who came to be known as the Sugar Creek farmer partners and with whom we share our research data on a regular basis. Holmes County is home to the largest population of Amish in the U.S., and almost half of the county is Amish. The Amish population typically does not participate in federally funded conservation programs. But since the start of the Alpine trading plan, we see many Amish at the annual SWCD dinner as a direct result of the solid partnerships forged with this plan.

There are a number of characteristics about the Alpine Nutrient Trading Program that make it unique. First, it is a minor NPDES permit. Minor permits are classified as having less than 1 million gallons per day (MGD) design flow. Alpine Cheese Company's permit is for 0.14 MGD. Typical of minor permits which are common for small towns throughout Ohio and the US, the cost per gallon for a facility upgrade is very expensive (several times as much) compared to major permits that have design flows of over 1 MGD.

A second feature of the Alpine Nutrient Trading Plan is that it has been funded 100% by the Alpine Cheese Company. There were no federal or state tax dollars spent on the program. The original plan paid for an extra employee and administrative costs at the Holmes County Soil and Water Conservation District office and funded sampling and other research by The Ohio State University at OARDC. Because Ohio EPA required extensive "voluntary sampling" as part of the regulatory permit, the initial cost of the program--$800,000 over five years—was high. Although we are still required to conduct "voluntary sampling" during the second NPDES permit cycle, we can now get it done with about half the cost ($318,000 for the second five years). We expect that a further reduction of perhaps as much as half could be achieved if Ohio EPA will agree to have the program stop conducting voluntary sampling and if the program starts to sell nitrogen credits. Assuming sales of nitrogen, no voluntary monitoring, and full administrative and staff cost recovery at the SWCD and OSU, the price per credit would be in the $20-25 range. From the viewpoint of the factory, the plan cost about half as much as a full facility upgrade to the 1mg/L level. The plan also bought time for the partial facility upgrade to be gradually improved to come closer to the target reduction at a lower cost. By the end of the first permit in late 2011, the cheese factory was getting very close to the required permit level so hopefully trading might not be necessary by the third permit renewal.

The third salient feature of the Alpine Cheese Nutrient Trading Plan is that the front-end investment has long-lasting economic benefits. The reduction in cost of the program from the first five-year permit to the second is largely due to the fact that long-term (15-20 year useful life) conservation measures were used in the majority of the credits and were paid for during the first five years, leaving only a minimal maintenance cost for the second five-year permit. This would be true for a third and perhaps 4th permit cycle or as long as the conservation measures can be proven to be functioning. Because the watershed has a high concentration of animal agriculture, conservation measures that deal with manure are predominant. These include carrying out a comprehensive nutrient management program (CNMP) which reallocates nutrients appropriately on the farm acreage, installing heavy use pads, containing milk house waste, diverting barn roof runoff, and creating manure storage facilities. One of the leading

conservation measures was milk house waste which for the community was very symbolic of farmers doing their part to fix the pollution related to the cheese factory since milk is needed to make cheese. OARDC, Holmes County SWCD and ODNR worked together to add this conservation measure to the ODNR load reduction spreadsheet used for calculating credits. The conservation measure usually entailed capturing the effluent in a subsurface tank and land applying it back onto the field. Because OEPA had considered milk house waste a direct point source violation since it came out of a pipe, an agreement to proactively classify this conservation measure for a 1:1 ratio was reached.

Fourth, externalities of the project—besides improved river ecosystem health—included increasing the herd health of the cows, the productivity of the local dairy economy and community development. From the local community viewpoint, the plan made symbolic sense because both sides of the pollution problem (the factory and the farmers) worked together to solve it. There were also direct economic benefits to both parties. The somatic cell bacteria count and rates for mastitis dramatically decreased when farms fenced cows out of the stream using a conservation measure called "fencing exclusion." Because the local cheese factory paid a premium for lower somatic cell counts per hundredweight (cwt) of milk, farmers received approximately $0.75/cwt more in milk premiums because the cheese factory was able to produce more cheese from it. In addition, and partially as a result, the cheese factory was able to expand its production, creating 12 new jobs at the factory, which also helped to foster the eco-friendly cheese niche of the area.

Fifth, the Alpine plan was a model for the Holmes County owned Walnut Creek Wastewater Treatment Plant (WWTP) Water Quality Trading Plan, which is being used as insurance in the event that their facility upgrades were insufficient to achieve the targeted phosphorus reductions required in their NPDES permit. Walnut Creek WWTP is financed and managed through the county commissioners. So, from a county level, it makes sense to save money on the WWTP upgrade and share those savings to finance the county SWCD while returning tax savings to the citizens.

Sixth, the plan used a combination of trusted community partners with the cheese company. The broker for the plan was the Holmes County Soil and Water Conservation District, who consistently has scored at the top of most trusted organizations according to surveys that we have conducted with the local community. Because the SWCD staff has a good relationship with the community, it was easy to ask influential farmers to host small community meetings on farms to explain the program, and word of mouth within the Amish community increased participation. The first step was asking the farmer to fill out a self-assessment form, which indicated which conservation practices were needed. After determining how many credits could be generated on the farm and balancing that with the ones that the farmers preferred, the farmer was offered up to $30/credit to install the practices, which he agreed to maintain for five years. The university was the other partner in the plan. Our surveys in this community placed OARDC and Ohio State Extension as the next highest trusted groups in the community. The role of the university was to make impartial recommendations for the program, collect water samples, conduct research on water quality, and act as a neutral third party in facilitating relationships with agencies such as the Ohio EPA. For example, OSU helped the Holmes SWCD, the Ohio Department of Natural Resources, and the Ohio EPA agree to a memorandum of understanding on how to verify the credits. When we started, the Ohio EPA did not have trading rules, so their Northeast District office was helpful in creating the program. However, several times negotiations stalled and Representative Bob Gibbs was instrumental in helping to move the project along. The Ohio Farm Bureau also helped out with suggestions in the early planning stages. All of this activity fostered stronger relations between the Amish dairy farmers and the

SWCD. In fact, after the program started, one Amish farm invited all the county 5th graders to visit his farm to learn about agriculture first hand.

The Alpine trading plan was founded on the above principles and had strong community support from the start and these ideals spread into the creation of the Muskingum River Watershed Quality Trading Plan. Because of the local popularity of the program and increased budget constraints from ODNR and local counties which together fund SWCDs in Ohio, news spread among neighboring county Ohio SWCD offices and county commissioners about how the Holmes County SWCD office had created a new revenue source for conservation. Wayne County Commissioner Ann Obrecht called a meeting of neighboring county commissioners and SWCD managers and supervisors in 2009. Subsequent meetings created the 21 county Muskingum River Watershed Joint Board of Soil and Water Conservation Districts which was approved by the Ohio Commission on Soil and Water. The group met for the first time in June 2010. The ODNR program specialists provided invaluable facilitative and organizational assistance. The Muskingum Plan is still in its early stages but has created application forms for the farmers and permit holders that will be posted on their website. The original Alpine trading model has been incorporated into the Muskingum plan by keeping county SWCDs as sub-brokers responsible for brokering between farmers and point sources where trades can be kept within their counties. When cross-county trades occur, a Technical Advisory Committee ranks the intra and inter county bids. When ranking point source bids, a point system is used which values county conservation targeted priorities, prior compliance history, stream attainment level, upstream land uses, headwaters, economic and ecological significance, and public health. The program is still in its infancy but there is presently interest by three point sources. At this point there is widespread interest by farmers in the Tuscarawas HUC 8 watershed of the Muskingum Watershed so it is expected that the program will take off in 2014. The Ohio DNR funded a $50,000 grant to the Holmes County SWCD to prepare proposed plans for the remaining sections of the Muskingum plan. These were submitted to OEPA and are pending approval.

Specific Recomendations:

1). The water quality trading programs in Ohio and perhaps nationally should focus on minor NPDES permit holders.

In Ohio there are 3341 active NPDES permits according to Ohio EPA. As shown in Table 1 below about half the amount of water treated by NPDES permits comes from minor permits with a design flow of less than 1 MGD. However, it is the level of phosphorus and nitrogen being monitored and treated that is of greater significance. Major permit holders tend to have more monitoring, more limits, and are closer to their limits than minor permit holders. Thus, it is clear that more pollution is available for trading from minor point sources. Furthermore, there is a general trend that minor permits are located in the headwaters of watersheds so there is a multiplier effect as described in Recommendation 3 below.

Table 1: Major and Minor NPDES Active Permits in 2013

	Count	Approx. Avg. Daily Flows
Major:	300	10.6 billion gallons per day
Minor:	3041	10.7 billion gallons per day
Total:	3341	21.3 billion gallons per day

Source: Information provided by Ed Swindall from Ohio EPA in the Division of Surface Water and the Permit Compliance Unit. These data are approximate 2013 values for total average daily flows after adjusting for outliers and for flows that were reported incorrectly.

In the Tuscarawas HUC 8 Watershed of the Muskingum trading plan (Phase 1), 56% of the 16 major permits had phosphorus and nitrogen limits compared to only 9% and 49% for the 295 minor permits. For the large number of minor permits that did not have phosphorus limits or monitoring, it is not uncommon to find phosphorus levels at 3 mg/l instead of the 1 mg/l more commonly found among the major permit holders. In a survey of wastewater treatment plants of both major and minor permit holders in the Upper Scioto Watershed (2012) we found approximately 75% of the treatment plants were willing to consider partial upgrades plus trading to achieve their permit levels for phosphorus. We also found that 70% of the majors and 50% of the minors were willing to consider lowering their level below the permit level if they could sell the credits downstream.

One of the strongest arguments for focusing water quality trading on the minor permit holders is the higher cost per gallon of treatment. According to Hartman and Cleland (2007), the cost for facility upgrades for minor permits is anywhere between 2 and 7 times as great as majors depending on the phosphorus and nitrogen regulatory limit.

Because of the high cost of treatment per gallon, minor permit holders are able to offer higher prices for nutrient credits if transaction costs can be kept low. This is why the Alpine plan was so effective even though the cost per credit was relatively high. At the same time, when trading programs are started to solely benefit major permit holders, there is a drive to keep the cost per credit low, such as through reverse auctions, in order to match the low cost per gallon associated with large-scale facility upgrades.

2). Community-based water quality trading programs at either the HUC 8 level or county level provide benefits over larger-scaled programs.

First, trading success depends on having a trusted broker. Surveys conducted by my team and others show that the local SWCDs and land-grant universities rank high on trust by both the WWTPs and the farmers. These scored significantly higher in trust than other agencies or NGOs.

Second, within the same county jurisdiction it is possible for county commissioners who control the budget for the county WWTP and the county SWCD to save money if they can fund county SWCD's through having their county WWTP's participate in trading. 100% of the Upper Scioto HUC 8 watershed WWTP sample of 19 major and minor permits said that they would be more inclined to participate in trading if the county SWCD could be funded through the program.

3). Trading should focus on areas of most impact: headwaters and critical source areas.

Water quality trading should target the largest sources of pollution whether it is for buyers or for sellers of credit. Headwaters have a multiplier effect. The work by Alexander et al (2007) documents that first-order headwater streams contribute approximately 70% of the mean annual water volume and 65% of the nitrogen flux in second-order streams. Progressing further downstream, they contribute about 55% and 40% in fourth-order and higher-order rivers that include navigable waters and their tributaries.

Knowing the location of critical source areas of nutrients can make trading more efficient and lower the cost. My doctoral student Yina Xie was able to identify critical source areas of nutrient concentrations in her doctoral dissertation (2014). By using SWAT modeling of the Upper Scioto Watershed in Ohio, she documented that 22% of the land accounted for over 31% of the

phosphorus nutrients. Zones featuring large slopes, application of manure, non-conservation tillage methods, corn-soybeans rotation, and installation of systematical tile drains contributed disproportionately high nutrient loads compared to other zones.

4). Locally-based programs are likely to have creative solutions to achieve water quality objectives. As in the Alpine case, local people from different public and private agencies can effectively create new solutions that work well with the goals of local economic development. Also it is recommended that trading not be limited to NRCS approved conservation measures. While these have a proven track record, sometimes they are too rigid or insufficient. The addition of a clause in trading rules of using "scientifically proven innovative conservation measures" such as the Alpine milk house waste case could utilize the expertise of each state's agricultural experiment station which all have the goal of creating new scientific solutions for agriculture.

Improved modeling techniques are making targeted trading at the local county level a reality. For example, the APEX model developed by Texas A&M, is appropriate for small watershed trading and can evaluate site-specific conservation measures within a watershed at appropriately small scales. Such models provide the opportunity for pre-trading analysis of nutrient production and transport at field to farm to small watershed scales and to evaluate the utility and costs of potential nutrient trades.

Local solutions are also likely to create appropriate suites of complementary conservation practices such as we did in the Alpine cheese case. For example, we usually coupled CNMP's, milk house waste, and other manure management practices such as manure storage facilities. In the Upper Scioto Watershed research by Xie, we found that the suite of nutrient management, conservation tillage, and cover crops was associated with well-educated, managed farms which specialized in grain production with high rates of rental land often using GMO technologies. In the Corn Belt tenancy rates of 60-70% are common. We have found that for tenant farmers adoption of practices that are compatible with the short-term farm profitability, such as conservation tillage, are popular whereas nutrient management, cover crops, lengthening crop rotations, or putting in infrastructure such as systematical drain tiles are less favored.

Statement of the American Farm Bureau Federation

TO THE HOUSE COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT

REGARDING: NUTRIENT TRADING AND WATER QUALITY

Tuesday, March 25, 2014

Presented By:
Carl Shaffer
President, Pennsylvania Farm Bureau
Board Member of the American Farm Bureau Federation

600 Maryland Ave SW | Suite 1000W | Washington, DC 20024 | p 202.406.3600 | f 202.406.3606 | www.fb.org

AFBF is the unified national voice of agriculture working through our grassroots organizations to enhance and strengthen the lives of rural Americans and to build strong, prosperous agricultural communities.

Farm Bureau represents more than 6,000,000 member families across the nation and Puerto Rico with organizations in approximately 2,500 counties.

Farm Bureau is an independent, non-governmental, voluntary organization of families united for the purpose of analyzing their problems and formulating action to achieve educational improvement, economic opportunity and social advancement and, thereby, to promote the national well-being.

Farm Bureau is local, county, state, national and international in its scope and influence and works with both major political parties to achieve the policy objectives outlined by its members.

Farm Bureau is people in action. Its activities are based on policies decided by voting delegates at the county, state and national levels. The American Farm Bureau Federation policies are decided each year by voting delegates at an annual meeting in January.

Chairman Gibbs, Ranking Member Bishop, Members of the subcommittee, thank you for the invitation to appear today to testify on "Nutrient Trading and Water Quality." I am Carl Shaffer. I have the privilege of serving on of the Board of the American Farm Bureau Federation and as President of the Pennsylvania Farm Bureau. Farm Bureau represents farms of all sizes, spanning virtually all commodities grown and sold in our great nation. I own and operate a farm in Columbia County, Pennsylvania, where I raise corn, soybeans and wheat. All the land I farm is in the Chesapeake Bay watershed, and most of the land is within sight of the Susquehanna River. I am pleased to offer this testimony on behalf of the American Farm Bureau Federation and its more than 6 million members. I would like to make five points in my testimony today:

- First, while Farm Bureau supports the concept of water quality trading with voluntary participation, managing nutrients is inherently complicated and any water quality trading system must take that into account;
- Second, trading and offset programs are creatures of state law and they are tools that states may authorize and use to improve water quality;
- Third, trading, if properly designed and implemented, can help make attaining nutrient water quality standards more affordable, and attainable;
- Fourth, effective trading programs will not occur if EPA or states create a credibility crisis by imposing too many barriers to the orderly operation of a market; and
- Fifth, the underlying assumption that it is easy and inexpensive for farmers and nonpoint sources to reduce nutrient loading is a myth.

Concept of Water Quality Trading

Farm Bureau policy supports the *concept* of water quality trading; implicit in that is the notion that participation by farmers is voluntary and that the system reflects the realities of agriculture. Farm Bureau has a long history of supporting market-based approaches to improving the environment. We have also encouraged states to include trading in their toolbox to help implement state water quality programs because trading and offsets can reduce costs associated with achieving environmental improvements.

Even with that history of support, however, farmers and ranchers remain skeptical of trading programs in general and those associated with water quality specifically, and for good reason. Farmers grow things and understand that nutrient enrichment is a predictable outcome of all human activities – not just farming and ranching activities. Farmers understand that agricultural activities – like those in virtually every other part of life, such as shopping malls, golf courses, residential areas to name just a few – can affect the amount of nutrients that reach our waters. The fact is, each and every one of us plays a role in water quality; we all contribute to nutrient loading, either directly or indirectly, through the food we consume, the products we purchase, and the way we live our lives.

Unfortunately, EPA's environmental strategies too often focus more on affixing blame for problems or regulating some activity or person, rather than finding solutions that recognize and seek balance. EPA's toolbox is both limited and dominated by an approach that focuses heavily on pollution prevention and reduction based on the concept of polluter pays. For conventional pollutants, this approach has resulted in costly controls and restrictive permits on point sources. At the same time, there is an ongoing misperception that agriculture chronically over-applies nutrients. Nutrients, however, are not conventional pollutants – they are a combination of *pollutants* from point sources and pollution from nonpoint sources. The fact is, nutrients are critical for optimal productivity in agriculture even though farmers and ranchers are striving for the best possible ecosystem function. Managing nutrients is extremely complicated because there is not one practice, technology or approach that can optimize nutrient utilization throughout the environment. Therefore, we need policy options that are balanced. We must develop solutions that optimize outcomes. We all want: 1) safe, affordable and abundant food, fiber and fuel; 2) vibrant and growing communities with jobs and expanding economic activity; and 3) fishable and swimmable waters.

The challenges presented by trading and offset programs are the complex interplay of economic scenarios that could play out over time when such programs are taken to their logical conclusions. For example, if regulatory offsets are required for any new development or for expanding economic activity, one would expect a regulatory offsets process to trade low-value economic activity for high-value activity. In real life, however, such a program would not be likely to require an old home to be torn down before a new home could be constructed. Likewise, the construction and operation of a new manufacturing facility and the jobs inherent to that economic activity would not likely come at the expense of other high-value economic activity. But trading programs will allow "tradeoffs" and the result will undoubtedly be a shift in development activities out of lower value areas, likely rural areas and farmland, into high value urban areas. The downside of such an offsets program can be represented by simple math. For example, within an urban area, land suitable for building a factory could be valued at $100,000 or more per acre, while land in the same geographic area suitable to produce corn or soybeans could be valued at $10,000 per acre. In a market-based system, it would appear to be only rational to extinguish the environmental externalities generated by the farmland to offset the externalities associated with the higher value economic activity of manufacturing. While this may be an extreme example, the reality is that the nation has never used water quality as a mechanism to cap or, in some cases like the Chesapeake Bay, reduce economic activity. The long-run reality for farmers and ranchers would be that, over time, rural areas will have fewer and fewer means to sustain themselves.

Trading and Offsets are Creatures of State Statutes

The Clean Water Act leaves the task of controlling water pollution largely to the states; it expressly recognizes, preserves and protects "the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution [and] to plan the development and use ... of land and water resources." Authorized federal involvement in state actions is carefully limited. Under no circumstances does the act authorize EPA to assume state responsibility to develop a planning process or a Total Maximum Daily Load (TMDL) implementation plan. It is within these contexts that trading programs are often contemplated. As such, states may implement trading

and offsets programs established under state laws. In addition, states retain the flexibility to choose both if and how to use trading in the implementation of state water quality programs.

Nutrient Standards May Not be Affordable or Attainable Without Trading

Optimizing nitrogen and phosphorus utilizations through trading may hold potential, but there are significant scientific, market and regulatory challenges. First, from a scientific standpoint, there is no direct relationship between agricultural nutrient management practices and nutrient loss. If the relationship were direct, trading would be straightforward, transparent and enable orderly operations of markets.

Second, under the Clean Water Act, states establish and EPA approves water quality standards and criteria. States are currently feeling pressure from EPA to adopt default numeric nutrient standards and criteria based on the level of nutrients found in pristine waters. Such an approach holds the prospect of establishing standards that force states to adopt costly control measures that, in the end, are not realistically attainable. If EPA is successful, cities, agriculture and other sources of nutrients will incur significant regulatory costs without any guarantee that water quality improvements will match the required level of investment. Restrictive state standards that are not based on reference waters can be unachievable and require costly control and management measures.

EPA and States Are Imposing Barriers for Markets and Trading

Achieving the environmental and economic goals of point source - nonpoint source (PS-NPS) water quality trading depends on having understandable rules that clearly define what is being traded and the parameters of the exchange. Trading rules and procedures establish who can trade, what is traded (credit definition), duration of a credit, baseline requirements (for calculating credits), accepted procedures for calculating credits, how the trade occurs, trading ratios, verification, liability rules, and enforcement procedures.

In theory, trading assumes market participants have full information about the cost and effectiveness of their nutrient reduction options and can instantly and, at little-to-no-cost, obtain information on credit market prices and quantities. However, in the real world people are faced with limited time, resources, skills and acquaintance with markets. Complex rules and inadequate institutional design can result in poor buyer or seller participation, coordination failures and lack of desired outcomes. (Shortle, 2013).

In fact, ex-post assessments of PS-NPS water quality trading programs already in existence have generally been negative about their performance. Most have seen little or no trading activity, with the expected role for nonpoint sources unrealized. A number of reasons have been presented including a lack of trading partners (due to limited regional scale or underlying economics), inadequate regulatory incentives, uncertainty about trading rules and practice performance, excessively high PS-NPS trading ratios (increasing the cost of nonpoint credits), legal and

regulatory obstacles (including liability concerns), high transaction costs, and participant unfamiliarity and inexperience.

Pennsylvania's experience with water quality trading illustrates a number of the challenges I have mentioned. For example, the rules underlying Pennsylvania's nutrient credit trading program, created in large part in response to an EPA mandate to reduce pollution in the Chesapeake Bay watershed, are the product of a multi-year stakeholder negotiation process that was codified in regulation in 2010. However, shortly thereafter, EPA announced that it would undertake a review of the offset and trading program in each Chesapeake Bay jurisdiction. EPA's assessment included questions about whether or not Pennsylvania's agricultural trading baseline met the requirements of TMDL—in spite of the fact that trades had already taken place under the program rules in place at the time. Further, the assessment included EPA's expectations that Pennsylvania would demonstrate that the existing baseline was sufficient to meet the TMDL, or otherwise make "necessary adjustments" to the baseline acceptable to EPA.

In response to EPA's review, Pennsylvania has since proposed a number of possible changes to its trading program that have raised serious questions among existing and potential credit generators and users about what the rules governing the market for credits will look like going forward. Specifically, many are concerned about what happens to non-point source credit generators, primarily farmers, who have generated and sold credits under Pennsylvania's existing program, and who may have long-term commitments to provide credits for years into the future. The uncertainty is not conducive to sustaining a successful, transparent, long-term water quality trading program.

The Myths – It's Neither Easy Nor Inexpensive

It is often assumed that agriculture can supply credits less expensively than other nonpoint and point sources. Whether or not this is true depends heavily on the trading rules and procedures described previously. Baseline requirements represent one trading rule that has an important impact on agriculture's ability to be the low-price supplier of credits.

Baseline requirements establish the level of stewardship farmers and ranchers perform on a parcel of land before they are eligible to participate in the trading program and actually produce credits for sale. Any abatement necessary to meet the baseline cannot be sold as credits, but is instead credited to meeting the load allocation for agriculture. When baselines are more stringent than current practices, a farmer would only be willing to create and sell credits if the expected credit price were high enough to cover the cost of meeting the baseline *plus* the cost of any measures taken to produce additional abatement. This increases the cost of supplying credits, and reduces the amount of credits purchased by point sources.

Current research suggests that concerns about baseline requirements are well founded. Stephenson et al. (2010) found that when the baseline is more stringent than current practices, agricultural credit costs for nitrogen can surpass costs per pound (for marginal abatement) for point sources because the baseline has claimed the lowest-cost pollutant reductions. Ghosh et al. (2011) found that Pennsylvania's baseline requirements significantly increased the cost of entering a trading program, making it unlikely that nonpoint sources that could reduce nutrient

losses for the lowest unit costs would enter the market. Wisconsin has expressed concern that EPA's approach to defining baselines could obstruct agricultural sources' participation in trading programs and possibly impede water quality improvements (Kramer, 2003). The impact of baseline requirements is a crucial matter and fundamental to the successful operation of any trading program, though its impact is not unique. Any trading rule or requirement that is incorrectly developed can have similar effects: fewer nonpoint source credits purchased by point sources, and total abatement costs for regulated sources higher than they could have been.

As a regulatory agency, EPA appears to have difficulty appreciating the realities of how markets function. The agency is not necessarily tasked with creating private markets and most people would probably agree that the agency has difficulty appreciating the realities of how real markets function. As a result, environmental markets are suffering from a significant creditability crisis. This ultimately results in skeptical farmers and ranchers who then take a cautious approach to nutrient trading.

Regarding the cost of reducing nutrient loads, if it were easy and inexpensive for farmers and ranchers to reduce nutrient loadings, they would have already figured out a way to capture the benefit associated with incremental nutrients lost to the environment. Farmers today use some of the most advanced technology in the world to optimize their productivity. From precision application using 4R nutrient stewardship to GPS technology, farmers and ranchers are committed to improving their production efficiencies, a fact that allows them in turn to reduce their environmental footprint. 4R nutrient stewardship is an effective concept that allows a farmer to use the right fertilizer source, at the right rate, at the right time and with the right placement to optimize nutrient utilization, while precision agriculture is a farming system that uses technology to allow closer, more site-specific management of the factors affecting crop production.

For example, in precision agriculture, utilizing GPS and yield monitors, farmers can measure their output more precisely by matching yield data with the location in the field. Special computer-driven equipment can change the rate at which fertilizers, seeds, plant health products and other inputs are used, based on the needs of the soil and crop in a particular portion of a field.

Farmers have embraced precision agriculture and the 4R philosophy because it is an innovative and science-based approach that enhances environmental protection, expands production, increases farmer profitability and improves sustainability.

Conclusion

Your constituents want affordable and abundant food, fiber and fuel, and the members of Farm Bureau want the chance to provide them. Farmers are concerned about the environment. As technology evolves so do farmers. We take advantage of technology, new practices and programs in order to not only provide safe, affordable and abundant food, fiber and fuel, but also to protect our land, water and air resources.

As I hope my remarks illustrate, trading *in concept* has the potential to be another useful tool in a farmer's toolbox. As a *concept* trading can make achieving nutrient water quality standards more affordable and attainable. However, *in practice,* trading is not always so simple as regulatory and cost barriers can hinder the implementation of successful trading.

Again, thank you for the opportunity to provide testimony to the committee today.

Statement of Brent Fewell, Esq.
On Behalf of The National Water Quality Trading Alliance

Before the House Transportation and Infrastructure
Subcommittee on Water Resources and Environment

March 25, 2014

"The Role of Trading in Achieving Water Quality Objectives"

Chairman Gibbs, Ranking Member Bishop, and Members of the Subcommittee, thank you for the opportunity to testify today on this topic. My name is Brent Fewell and I am a partner with the law firm of Troutman Sanders. I have been integrally involved with water quality trading for the better part of two decades, both as a former EPA water official and as a lawyer advising market participants on these emerging markets.

I am honored to be here today representing the newly formed National Water Quality Trading Alliance ("Alliance"), a national consortium of leaders from the business, governmental, non-profit, regulated, private capital and entrepreneurial community focused on enhancing and expanding market-based opportunities for improving water quality. The Alliance is working to support comprehensive and coherent government rules and policies as well as the development of new and existing state and regional trading markets, supporting both point and nonpoint uses, while serving as a platform to advance the science and ecological effectiveness of water quality trading. Our membership includes American Farmland Trust, Association of Clean Water Administrators, Chesapeake Bay Nutrient Land Trust, Ecosystem Insurance Associates, LLC, Ecosystems Services Exchange, Electric Power Research Institute, Environmental Banc & Exchange, Keiser & Associates, National Association of Clean Water Agencies, Restoration Systems, The Freshwater Trust, World Resources Institute, Willamette Partnership, and the U.S. Water Alliance.

Traditional Tools and Approaches Alone are Not Sufficient

The U.S.EPA estimates that nearly 50 percent of the Nation's waters remain impaired due to pollution from, among other sources, excess nutrients, sediments, and temperature. According to a 2010 National Lakes Assessment, EPA found that nearly 20 percent of the 50,000 lakes surveyed were impacted by nitrogen and phosphorus pollution. Similarly, in the 2006 Wadeable Stream Assessment, the EPA concluded that 30 percent of streams were impacted. The most notable great water bodies that remain impaired are the Gulf of Mexico and the Chesapeake Bay. The hypoxic zone in the Gulf of Mexico alone measures almost 6,000 square miles, an area the size of the State of Connecticut, and continues to impact commercial and recreational marine resources in the Gulf worth hundreds of millions of dollars. For over four decades, the U.S. EPA and the Chesapeake Bay partners have strived to restore the Bay by reducing the levels of pollution impacting the natural resources, initially, through voluntary measures and, now, with the use of a Total Maximum Daily Load (TMDL). Yet that goal remains elusive and, thus far, beyond reach.

These hypoxic conditions are caused by excess nutrient runoff from agriculture, waste water treatment plants, stormwater, and growth in transportation and infrastructure and other human activities in the watershed. Water pollution caused by stormwater runoff and a myriad of diffuse, unregulated sources in any given watershed remains an intractable problem. As the Academy of Public Administrators noted in a 2010 report titled *Taking Environmental Protection to the Next Level*:

> When we fertilize our lawns, drive our cars, wash our dishes, or go about our daily routines, we contribute to making our streams, rivers, bays and oceans unswimmable and toxic to marine life. The same potential arises as farmers grow the food we eat, when businesses dispose of the byproducts of their work, and when builders create new communities. In short, the necessities of life and pollution of our environment are inextricably linked.

While EPA and states have many tools in their regulatory toolbox to address water quality impairments, we cannot expect 20th Century tools and approaches, alone, able to tackle

the challenges that face us. Nonpoint source pollution will continue to grow in scope and scale as earth's human population grows toward 9 billion. And if we are to fix this growing environmental problem, we have to acknowledge its unique attributes that are immune from 20th Century solutions. We must use science to understand and define the assimilative capacities of our environment – i.e., the daily insults which Mother Nature can withstand and yet still thrive – and promote new ways and tools for the myriad of actors, inputs and sources to work within these ecological constraints. Government alone and traditional regulations are not enough to fix the problem, and must work in concert with market forces that offer sustainable solutions and a higher quality of life.

We Must Accelerate the Pace of Restoration with a Mix of Old and New Tools

Since the 1980s, water quality trading has been a concept that has taken hold in some states and regions through legislation and policies that strive to improve water quality and make ecological improvements. Building upon the success of the Acid Rain Program – a sulfur dioxide cap and trade program that cost-effectively reduced harmful acid rain – President Clinton, in 1996, made market-based approaches a hallmark of his Administration's initiative, Reinventing Environmental Regulation. Since the U.S. EPA's 1996 draft framework and the subsequent 2003 final trading policy, EPA has worked diligently with states, watershed groups, and other stakeholders, including private entrepreneurs and investors, to promote trading as an innovative, market-based approach that provides greater flexibility with the potential to achieve water quality and environmental benefits greater than would otherwise be achieved through traditional regulatory approaches. While it has taken time for markets and opportunities to develop, some state and local governments, non-profits and private entrepreneurs have succeeded in creating effective water quality trading programs and markets. I would like provide several examples of projects that have resulted in water quality trades, water quality and other environmental benefits, and cost savings with great potential to lead water quality trading to the next level.

The Rogue River, an important salmon stream in Oregon, is impaired by water that is too warm. To restore this stream to water quality standards imposed under the Clean Water Act,

regulatory agencies imposed new limits on the City of Medford's wastewater treatment plant. The City was faced with installing chillers to reduce the temperature of its treated effluent by about 1 degree Celsius at a cost of $16M, not including the significant consumption of electricity to operate large refrigerators (and the increased carbon footprint).

The community of Medford began to second-guess whether purchasing a large refrigerator for $16M was the best use of tax-payer money and whether it was the most environmentally friendly option. Lo and behold with the support of EPA and the state, and groups like the Willamette Partnership and The Freshwater Trust (TFT), Medford determined that a much better option existed. As it turns out, by planting tens of thousands of native trees – rehabilitating degraded streamside habitat (the largest factor influencing thermal conditions in the basin) – Mother Nature does a pretty good job of creating the temperature conditions salmon need to thrive once again.

Instead of reducing the temperature of its effluent by roughly 300 million kcals with chillers at a cost of $16M, Medford, using a 2-1 credit ratio, is reducing 600 million kcals of thermal loading (through a contract with TFT) to restore streamside vegetation and convert those actions into thermal load reduction credits at a cost of about $8M. After completing miles and miles of riparian re-vegetation over the next ten years, TFT will then monitor and maintain those sites for a total of 20 years to ensure their continued benefit to the watershed. These 600 million kcals per day of credits allow Medford to meet the load limits associated with the City's 20-year projected growth. And not only is there environmental benefit to salmon from cooler water, but a net uplift across the watershed through benefits to other wildlife species from the restored habitat and vegetated buffer strips that reduce nitrogen and other pollutants, further improving water quality. Over time this will provide more than twice the benefit for half the price of traditional tools.

In addition, the $8M left over can be used for other important things in the community of Medford, like paying police and fixing roads. The landowners and community love it and, for watershed efforts like this, people are forced to actually talk and work together for the common good – many people who might not ever have any need to speak or engage. People feel good

about their effort and they take pride in their community and the environment that supports it – and guess what, the critters benefit too.

Another project worthy of mention is the Ohio River Basin (ORB) Trading Project, lead by the Jessica Fox and the Electric Power Research Institute. The ORB Project and its partners have embarked on establishing a three-state program aimed at reducing nutrients impacting the Ohio River Basin and more broadly the Gulf of Mexico. Officials last year from the states of Ohio, Kentucky, and Indiana, and ORSANCO, signed an agreement to work together to establish such a trading program. Just a few weeks ago, during a ceremony to celebrate the ORB's first credit trade, Bob Perciasepe, Deputy Administrator for EPA referred to the Project as "historic," as it developed a credit transaction framework that could readily serve as a national model. The sound science and framework upon which the ORB interstate trading has been developed presents a unique and exciting opportunity to address the entire Mississippi River Basin.

Also worth mentioning are the state and regional trading programs that have emerged in states like Virginia, Maryland, North Carolina, thanks to innovative policies and the efforts of private environmental entrepreneurs like the Chesapeake Bay Nutrient Land Trust, Restoration Systems and the Environmental Banc and Exchange. The trading markets in these states, although different in scope and nature, affirm the potential of this unique approach to reduce nutrients and protect water quality. Trading also has great potential for helping reduce stormwater pollution, which remains one of the Nation's leading sources of impairment. These markets are real, robust, and generating credits that are being used by the regulated community, localities and state agencies. For example, in Virginia, the Virginia Department of Transportation is a significant purchaser of private market nutrient credits to address stormwater needs while saving tax payer dollars. Nutrient credit use is also widespread with stormwater compliance currently being addressed for projects in 22 different localities in Virginia. Water quality is being improved and protected at significantly reduced costs, allowing for sustainable growth based on private investment directed towards meaningful watershed protection and restoration. In this case, the environmental benefits created by these markets and private entrepreneurs are being achieved without the use of state or federal tax payer dollars. There is a growing list of other states with similar water quality trading success stories, such as Pennsylvania, Connecticut, Minnesota, and Ohio. Private actors, such as Alliance member,

Kieser & Associates, have also been instrumental in helping to shape and support these state programs.

I would be remiss if I didn't recognize the continued leadership of my former EPA boss, Ben Grumbles, and the U.S. Water Alliance, on whose board I serve. In addition to hosting a water quality trading summit last year in Cincinnati, Ohio, the U.S. Water Alliance convened several meetings of the Mississippi River Nutrients Dialogue, composed of leaders from agriculture, industry, and academia. From this process, the Alliance will soon release its report with recommendations in four areas, (1) research and monitoring, (2) watershed governance, (3) market mechanisms (such as trading), and (4) the futuristic "Environmental Utility" (a proposed statewide initiative to collect fees and sustain ecosystem services). Other key stakeholders instrumental in the Dialogue's success include the National Great Rivers Research and Education Center, the Environmental Defense Fund, NACWA, and The Johnson Foundation.

And although some critics of market-based approaches may view trading as a way to kick the can down the road and forestall progress, such criticism could not be farther from the truth. Trading programs are not intended to shuffle the chairs on the deck nor allow EPA and states to take their foot off the regulatory accelerator; rather, these programs offer a more flexible and cost effective way to manage the significant costs of resolving these big problems, and have the potential to accelerate the current pace of restoration.

Today's Water Quality Trading Programs are Getting Smarter and Better

Our investment in these markets over the last thirty years is paying off, but there is still more to accomplish to ensure these markets accomplish their ultimate goal, which is to clean up the water faster and cheaper. The projects mentioned above demonstrate that trading can work, and work effectively. We must learn from these experiences and continue to build trading programs based on sound science and ensure the inclusion of transactional transparency and verified credits to grow confidence in these market-based approaches.

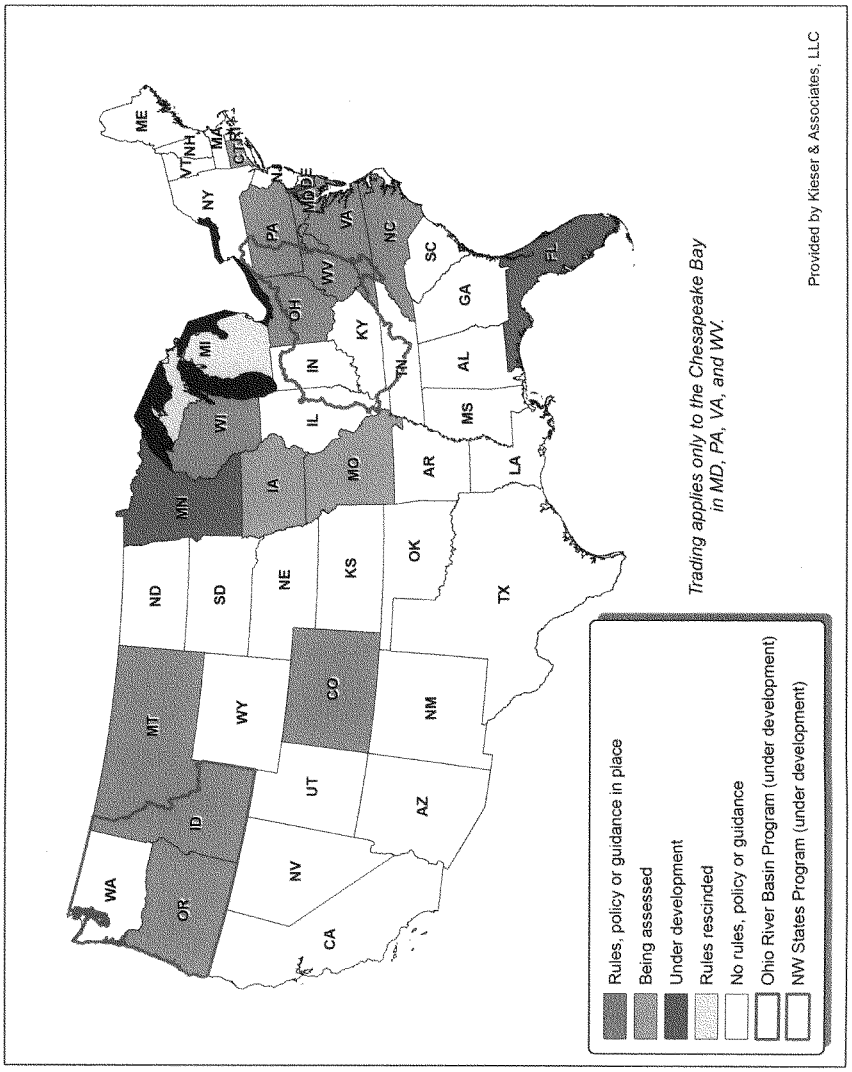
Toward this end, the recently formed National Trading Network, spearheaded by the World Resources Institute and the Willamette Partnership, is working with USDA, EPA, the states, and members of the National Water Quality Trading Alliance, among others, to develop

best practices and provide greater certainty and consistency in the manner in which trading is conducted. The Network and Alliance, who are working together, are separate entities with slightly different missions. To clarify, the Network will continue to focus on the science and standards that can be adopted and applied uniformly as trading programs continue to develop. The Alliance, many of whose members participate in the Network, is a national consortium of leaders and organizations who are working to support rules and policies (including third party certification) on trading and develop new and existing state and regional trading markets, while helping to advance standards and practices being developed by the Network.

For the last 200 years, we have altered and re-plumbed the hydrology and topography of our watersheds through development and to maximize agriculture production. Over 50 million acres of crop fields in the Midwest rely upon agricultural tile drainage, to manage subsurface water. Tile drainage, while critical to maximizing crop production, remains a significant challenge to reducing excess nutrients discharging to waterways. New technologies that now exist can effectively address agriculture runoff, in particular, and portend great promise from managing agricultural drainage and reduce excess nutrients and sediments impacting waterways while also generating tradable nutrient credits. For example, Ecosystem Services Exchange, an Alliance member, is working with landowners and producers to deploy the use of bioreactors, conservation drainage, constructed wetlands, riparian and saturated buffers. And while these efforts are beginning to yield dividends, they need to be significantly scaled-up to more rapidly restore the health of the Gulf and Chesapeake Bay. As noted earlier, privately funded market-based programs now exist to address stormwater nutrient impacts from development. While we must continue to maximize agricultural production to meet the needs and demands of a growing world population and accommodate development that is critical to our economy and way of life, we can and must do so in a more thoughtful and less harmful environmental manner. Toward this end, we must consider the overall environmental and financial benefits of allowing developers, wastewater treatment plants, power plants, and other entities regulated under the Clean Water Act and related state programs to utilize trading programs to achieve our collective water quality goals.

In closing, we cannot solve 21st Century problems with 20th Century tools. If we are to achieve the lofty goals of the Clean Water Act, we must resolve to embrace new and innovative market-based approaches such as water quality trading.

Thank you for this opportunity.


ME
VT
NH
MA
CT
RI
NY
NJ
MD
DE
PA
VA
NC
SC
GA
FL
WV
OH
KY
TN
AL
MS
LA
AR
MO
IL
IN
MI
WI
IA
MN
ND
SD
NE
KS
OK
TX
CO
NM
WY
MT
ID
OR
WA
NV
UT
AZ
CA
Rules, policy or guidance in place
Being assessed
Under development
Rules rescinded
No rules, policy or guidance
Ohio River Basin Program (under development)
NW States Program (under development)
Trading applies only to the Chesapeake Bay in MD, PA, VA, and WV.
Provided by Kieser & Associates, LLC

Chesapeake Bay Commission

Policy for the Bay

TESTIMONY

Ann Pesiri Swanson, Executive Director, Chesapeake Bay Commission

Subcommittee on Water Resources and Environment
Committee on Transportation and Infrastructure
U.S. House of Representatives

Tuesday, March 25, 2014

Thank you Chairman Gibbs, Ranking Member Bishop and Members of the Subcommittee for this opportunity to testify about the economic potential of nutrient trading in the Chesapeake Bay Watershed. The partnership of the Federal government is critical to the success of the Bay's restoration and I appreciate your interest in this important topic.

The Chesapeake Bay Commission is a tri-state legislative commission advising the General Assemblies of Pennsylvania, Maryland and Virginia on matters of Bay-wide concern. Fifteen of our 21 members are elected state legislators, three are cabinet-level secretaries representing each of our member states' governors, and three are citizen members. We are bipartisan and our members represent the full range of urban, suburban and rural life enjoyed across the watershed. In their work to write and enact laws and policies that further the goal of a restored Chesapeake Bay, our members must balance many ecological, social and economic concerns.

To that end, the Commission frequently conducts in-depth research on a variety of Bay-related issues. From blue crabs to biofuels and land conservation to the cost of a clean Bay, the Commission is known for its groundbreaking policy analysis. Recently, the Commission turned its attention to nutrient credit trading.

The Commission remains neutral on whether trading programs should be established or not. However, several states rely on nutrient credit trading in their Watershed Implementation Plans (WIPs) developed to comply with the Chesapeake Bay Total Maximum Daily Load (TMDL), and all three of our member states have begun to develop and implement nutrient credit trading programs. Therefore, the Commission felt it was necessary to answer two fundamental questions:

1) What is the potential for nutrient credit trading to lower the cost of TMDL compliance?
2) What are the critical elements that must be included in a nutrient credit trading program to provide cost-savings while ensuring environmental protection?

To conduct the economic analysis, we contracted with RTI International, an independent, non-profit institute that provides research, development, and technical services to government and commercial clients worldwide. We also convened a panel of environmental and trading experts to guide our work.

We evaluated a variety of scenarios with two main variables:
1) the types of nutrient sources allowed to participate by buying or selling credits.
2) the geographic boundaries within which a trade is allowed to occur (in-basin-state, in-state, in-basin, watershed-wide).

These scenarios and our key findings are described in our report entitled *Nutrient Credit Trading for the Chesapeake Bay: An Economic Study*. A hard copy of this report has been provided to you.

To summarize our findings, the answer to our first question is **"potential" cost-savings can be significant, especially at a scale that maximizes the balance of buyers and sellers**. But, potential cost savings will always be higher than actual cost savings when real-world conditions are at play in the market. Policy makers should not simply reach for the scenario that provides the greatest cost reduction without assessing other real-world factors like protection of local water quality.

To answer the second question, we found the following elements were most critical for maximizing cost savings and ensuring environmental protection:

1. **A measurable and enforceable pollution "cap."**
   A "cap," such as the Chesapeake Bay TMDL that applies to total loads across all sectors, ensures that reductions achieved through trading are not offset by increased loads occurring outside of the trading program. A cap also provides the incentive for buyers and sellers to enter the marketplace.

2. **Inclusion of urban stormwater.**
   To date, wastewater treatment plants have been the primary purchasers of nutrient credits. Due to the high cost of retrofitting urban stormwater controls, our report showed the greatest "potential" cost savings occurred when the trading scenario included regulated stormwater. As urban stormwater sources face increasing pressure to reduce nutrient loads at significant cost, they may seek nutrient credits from other less expensive credit sources, such as agriculture, as a path to compliance. However, the rules to establish this market are still under development.

3. **Protection of local water quality.**
   Nutrient credit trading can shift the geo-spatial pattern of load reductions. Program rules must ensure that any redistribution of loads resulting from credit trading is legally protective of local TMDL limits and local water quality.

4. **Robust verification and transparency.**
   Buyers need assurance that the credits they purchase will keep them in compliance. The public wants assurance that pollution reductions are real and that environmental improvement will result. Assurance is best achieved through a rigorous system of verification and approval of credits, monitoring, and enforcement. Despite the costs this would add to a program, our analysis found that "potential" cost savings were still significant.

In conclusion, the Commission does not have a position for or against trading. Instead, we acknowledge that trading is a tool already in use by our states, and it has the potential to improve water quality at a reduced cost, if it is done correctly. We believe that if the states pursue inter-state trading, it may be wise to begin in a targeted area where benefits can be maximized. Additionally, the Federal government would need to work collaboratively with the states to develop a common trading "currency" across states lines through consistent definition of a credit and common standards for verification and transparency. The Chesapeake Bay, our nation's largest, most productive estuary, is a shared responsibility -- not just of state and local governments and the private sector, but of the Federal government as well.

Thank you.

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Written Statement for the Record

Regarding:

The Role of Trading in Achieving Water Quality Objectives

Submitted to:

United States House of Representatives
Committee on Transportation and Infrastructure
Subcommittee on Water Resources and Environment

April 18, 2014

Jessica Fox
Technical Executive
Electric Power Research Institute

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

We appreciate the opportunity provided by Chairman Gibbs, Ranking Member Bishop, and Members of the Subcommittee to comment on water quality trading. The Electric Power Research Institute, Inc. (EPRI, www.epri.com) conducts research and development relating to the generation, delivery and use of electricity for the benefit of the public. An independent, nonprofit organization, EPRI brings together its scientists and engineers as well as experts from academia and industry to help address challenges in electricity, including reliability, efficiency, health, safety and the environment. EPRI also provides technology, policy and economic analyses to drive long-range research and development planning, and supports research in emerging technologies. EPRI's members represent more than 90 percent of the electricity generated and delivered in the United States, and international participation extends to 40 countries. EPRI's principal offices and laboratories are located in Palo Alto, Calif.; Charlotte, N.C.; Knoxville, Tenn.; and Lenox, Mass. EPRI does not advocate any regulatory or policy action.

Among other research to confront pressing environmental issues, EPRI is testing Water Quality Trading (WQT) as an innovative way to manage nutrient pollution in the Ohio River Basin (ORB). As nutrient loading comes from many sources, this project facilitates broad non-traditional collaborations towards achieving a common goal of protecting and improving watersheds at lower overall cost to society. Properly designed and deployed, the trading program in the ORB may allow exchanges of credits for nitrogen and phosphorus to meet both voluntary sustainability commitments and regulatory compliance obligations.

EPRI's interest is to apply rigorous systems to test whether WQT can be economically, socially, and ecologically viable over the long run. EPRI research suggests that WQT may provide a cost-effective option for power companies to meet the water-quality based effluent limit (WQBEL) portion of their NPDES permits. Trading also may provide important ancillary benefits to farmers and ecosystems, which are not realized by installing technologies at point source locations. The EPRI pilot project in the ORB is attempting to build the most robust set of protocols to date and has thereby accelerated a national discussion regarding optimal design of WQT programs, whether at a local or regional scale. We have extensively studied WQT efforts across the United States, learned from what works and what does not work, and attempted to address key gaps through the design of the ORB project. The defensibility of WQT rests largely on the specific protocols of each program, which vary considerably across the country. Important EPRI findings to date include:

- WQT is a developing market and will benefit from research on best practices, tools, and elevated stakeholder understanding. EPRI is advancing this maturation via the ORB pilot effort.
- With the science, tools, and policies for WQT evolving, it is probably premature to make generalized conclusions about WQT in the absences of specific program elements.
- There are fundamental differences between point-point trading and a program where farmers are the credit generators - these differences will influence appropriate credit ratios, verification, and uncertainty.

- Working via local Soil and Water Conservation Districts (SWCDs) to contact and enroll producers can be appropriate in many cases, and appropriate compensation may be considered (there is some compensation provided to SWCDs during the EPRI pilot project as explained below). However, not all states have district staff with the engineering, planning, and design expertise to implement projects, and they will need support to get a significant number of projects installed with producers.
- The balance between a farmer's confidentiality and the public interest in verifying that a permit limit is being met continues to be a point of discussion. Further, questions regarding who holds liability for failed conservation projects that generate credits still needs to be discussed (credit buyer, credit seller/aggregator, farmer, verifying party, or other).
- Nonpoint source credits that are "real" and comparable to installing a point source technology require careful documentation, modeling, and science at a level that can be costly and require highly skilled training. Sharing of resources via public access and collaboration may help curb the burden on individual projects, reducing costs to establish rigorous programs in the future.
- EPRI is committed to an adaptive management approach and encourages input from all participants and stakeholders in the pilot project to inform the appropriateness of WQT.
- It remains to be determined whether, after applying necessary rigor and science, 1) the market will support the fully burdened price of credits, and 2) observing stakeholders will be satisfied that trading is an appropriate tool for compliance.
- Ultimately, whether credits are real is fundamental to buyers committed to ensuring that their permits are met, to stakeholders who deserve to have confidence in the system, and to the ecosystem.

Overview of the Ohio River Basin Trading Program

EPRI has been researching WQT since 2005, with a specific focus on the ORB since 2007. In August 2012, the state agencies in Ohio, Indiana and Kentucky signed a pilot trading plan for the ORB making it a first-of-its-kind interstate water quality trading program. Utilizing solid scientific foundations, this project may result in a multi-industry market that could accelerate cost-effective watershed improvements, provide important ancillary ecological benefits, and move previously untapped resources to farmers. Following years of establishing key protocols, the project began executing pilot trades in March 2014.

There are several reasons why the EPRI project is working on an interstate basis, the most fundamental of which is dictated by the watersheds themselves. First, the watershed boundaries cross state lines (Figure 1). To have the largest possible benefit in-stream, it is important to follow the actual functioning of the watershed units. Second, for WQT to be successful there needs to be an adequate number of credit buyers and sellers. The larger the area, the greater the number of potential buyers

and sellers, and the more viable the resulting market. Lastly, a regional program will benefit from shared infrastructure, tools, and models, reducing the burden of program costs to local entities. Indeed, to build defensible WQT programs supported by science and modeling, shared resources and robust stakeholder input are critical. The participating states agreed with the benefits of working on an interstate basis, and in August 2012, Indiana, Kentucky and Ohio signed a first-of-its-kind interstate pilot trading plan where the states can operate under the same rules so that a water quality credit generated in one state can be applied in another. The current project approach anticipates selling credits generated by an up-stream farmer, within a Hydrological Unit Code 4 (HUC 4) watershed. As the map shows, many of the HUC 4 watersheds cross state lines.

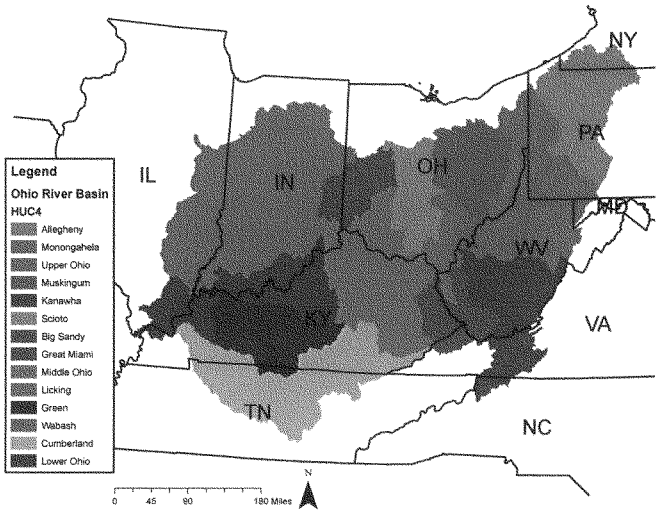


Figure 1: HUC 4 Watersheds in the Ohio River Basin.

Working with the States and SWCDs

To install practices and bring credits to market, EPRI is working directly with the state agriculture agencies and permitting authorities in all three states. EPRI has contracts with the three state agriculture agencies (Ohio Department of Natural Resources, Kentucky Division of Conservation, and Indiana State Department of Agriculture) to provide private financial support raised by EPRI to Soil and

Water Conservation Districts (SWCDs). Each state has received seed funds ($100,000) to remove 22,000 pounds of total nitrogen and 11,000 pounds of total phosphorus over a five-year period. The state agriculture agencies move these funds to SWCDs, who then contract with farmers to install approved U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS) conservation practices to meet performance standards that are known to reduce nutrient loading. Examples of these practices include cover crops, heavy use areas, and cattle exclusion fencing, among others. Both the state agriculture agencies and the SWCDs are reimbursed for their time and effort (estimated for the pilot period at 10% of funds passed to the farmers). The real cost of these responsibilities is being tracked to inform the adaptive management of the project going forward.

During this initial pilot period, and based on input from the agriculture community, farmers are paid up to 75% of their documented costs (up to $10,000) after the practice is installed. The $10,000 cap on each project ensures that our current private funding is distributed across multiple farmers in each state, and reduces the overall impact if one particular project does not generate credits. Some of the SWCDs are identifying potential farmers by looking at unfunded applications for USDA-NRCS programs. There is no risk to the farmer that credits will be sold; they are paid after on-site confirmation of practice installation, regardless of whether or when the credits generated from those practices are, in fact, transacted. For the initial pilot trades, EPRI owns and aggregates the resulting credits and has the responsibility for transacting, donating, or retiring those credits. From a farmer perspective, the ORB pilot project offers a privately funded cost-share opportunity, using a simple contract, and is implemented via their local SWCD. EPRI intends to reinvest money raised from the sale of the pilot credits back into the project operation and research.

Credit Verification, Monitoring, and Reserve Pool

Before any credits are issued in the ORB project, all projects must be installed, verified, and certified. This requires the following steps: 1) SWCD completes a practice "Installation" form after on-site inspection, including before and after photos, 2) The state agriculture agency completes a "verification" form based on on-site inspection and confirmation that the practice meets NRCS practice standards, and 3) The state permitting authority completes a "certification" form based on a desk review of all project records, photos, baseline confirmation, and regulatory review. All projects (100% audit) are monitored annually with on-field verification by the state agriculture agency and annual desk-review by the permitting authority. All farmers who participate in the project must meet baseline requirements including compliance with all local, state, and federal law, AND implement practices that are additional to current conditions (based on 3 years of farm practice history). EPRI's program will only issue credits after conservation projects have been implemented, verified, and certified. Before credit transactions (and application of a trading ratio), 10% of all credits are moved into a reserve pool, which can be tapped in the event of an unanticipated project gap or failure. Further, to ensure that the pilot project has a broader public benefit EPRI is voluntarily retiring 10% of all credits. Full

documentation, including on-site photos, is posted in the public view of the project's on-line credit trading registry (discussed below). The public can track every pound of reduction to a county level, but not all the way to a specific farmer.

Science, Modeling, and Ratios

EPRI's research on the appropriate quantification of credits in WQT has informed national discussions regarding ratios, uncertainty estimates, model calibration protocols, and credit equation factors. A fundamental challenge for water quality trading lies in understanding, quantifying, and managing the uncertainty associated with the implementation of on-the-ground practices and the associated water quality benefits over time and place. This challenge is especially pronounced when trading involves agricultural non-point sources as credit sellers, where there is no specific pipe from which to monitor or measure water quality. Trade ratios are used to ensure that the amount of reduction resulting from the trades has the same (or better) effect as would be required using a technology option at the point of compliance.

The ORB project is using a scientifically-based credit equation methodology that will account for location-specific nutrient attenuation factors, rather than a blanket trading ratio throughout the entire ORB. The ORB project utilizes two models for estimating nutrient reductions from the point of generation (credit seller) to the point of use (credit buyer). The models account for location-specific nutrient attenuation factors and ensure that the project pays for, and in fact delivers, performance (i.e. nutrient reductions, not simply conservation practices). The two models are: 1) the EPA Region 5 spreadsheet model for estimating nutrient reductions at the edge of the field (i.e., Point of Generation Credits); and 2) the Watershed Analysis Risk Management Framework (WARMF) model for estimating nutrient attenuation (reduction) from the edge-of-field to the point of use (i.e., Point of Use Credits).

The WARMF model is applied to predict attenuation from the edge of the field to the stream and the resulting in-stream responses to nutrient load reductions between credit sellers and credit buyers, thereby estimating the total nutrient reductions actually achieved at any particular point of compliance. These predictions account for a number of physical factors (e.g., location of buyer and seller, in-stream fate and transport, specific form of pollutant), as well as the uncertainty inherent in the model itself. In this way, the project calculates unique trade ratios for every single transaction, and accounts for the specific watershed characteristics between each buyer and seller. The further apart buyers and sellers are, the greater the uncertainty in the model, the higher the trade ratio and the greater the cost for each pound at the buyer location. Therefore, there is a driver for the market to self-select transactions that are "local," as that will provide the most favorable trade ratio. The seller (the farmer), however, does not absorb the "hit" of a distant buyer – it is the buyer's burden to purchase enough credits to meet their compliance obligation, wherever they happen to be in the watershed. The trading ratio is applied AFTER 10% of credits are moved to a reserve pool (see above discussion) and 10% of credits are voluntarily retired by EPRI.

While EPRI is not selling compliance credits at this time (hence, there is no "point of compliance" and no ratio applicable), the research has the scientific basis to support transactions occurring within a HUC 4 watershed.

Credit Registration and Tracking

A credit registry is a tracking system that follows a credit from creation to sale and ultimately to retirement. The credit registry customized for the ORB project provides checks and balances to ensure that each credit is created and used precisely as approved under the trading plan. The online registry provides security measures similar to online banking and provides transparency to the market. In one online location, information about each farm project is captured; agriculture agencies "verify" that best management practices have been implemented on the ground; permitting authorities "certify" that a credit is appropriate for regulatory compliance; credit buyers can search for credits available to purchase; and stakeholders can view public information on projects. Further, the registry utilizes EPRI's watershed model to calculate specific trade ratios for each transaction based on the location of particular buyers. The registry assigns a unique serial number for each pound of nutrient reduction, eliminating the risk of double counting. The serial number allows for tracking of the credit through its lifecycle. The registry is a key component of the ORB project and ensures the same process and protocols are applied across multiple states.

Credit Price and Definition

One credit is equal to one pound of total nitrogen (TN) or total phosphorus (TP) that, through voluntary action, is prevented from discharging into the ORB in a given year. EPRI chose to use a cost-based price model to support the first credit transactions in the program. The goal was to use a pricing method that incorporates the full cost of implementing the program assuming there was no government or state subsidy. At a summary level, EPRI included: 1) the cost of project activity done on the farm, 2) the cost of project administration (including burden to the SWCDs and state agriculture agencies), and 3) the cost of addressing project risk. The first transactions sold a 3-year stewardship credit for $10 each. Each stewardship credit represents a bundle of quantified nitrogen and phosphorus reductions, plus qualitative ancillary ecosystem benefits (pollinators, soil health, greenhouse gas reduction, etc). If the credits were unbundled and sold as individual pounds of nitrogen or phosphorus, each pound of either nitrogen or phosphorus would cost $10 under the pricing system. Going forward, as part of the research effort EPRI plans to use an auction to sell credits, where the credit price will be determined by traditional market supply and demand forces, and not subsidized by federal or state funding.

As a non-profit research organization, EPRI determined that during the pilot period it would not sell credits that are applied towards a National Pollutant Discharge Elimination System (NPDES) permit obligation. Given the general absence of numeric nutrient criteria, TMDLs or other water quality

regulatory "drivers" in the ORB, EPRI also lacked the impetus to transfer the project to another organization. Therefore, EPRI is currently testing all program design elements through the transaction of "stewardship credits." A "stewardship credit," like any other water quality credit, is a quantified and verified representation of a reduction of a pollutant. What makes a stewardship credit different is that it will be retired for the public benefit and not applied towards a regulatory permit obligation. Duke Energy, Hoosier Energy, and American Electric Power are the first buyers in the program and on March 11, 2014, the companies purchased 9,000 stewardship credits, agreeing to retire the associated nutrient and ecosystem benefits, rather than apply them towards possible future permit requirements. The buyers can use the credits to meet corporate sustainability goals and their voluntary participation may also be considered by the state permitting agencies when determining the need for flexible permit compliance options in the future.

Stakeholder Engagement

It has taken an array of collaborators from many sectors to make WQT possible at this scale. Some of the organizations that have and continue to work diligently to realize this project include the States of Ohio, Indiana, and Kentucky, American Electric Power (AEP), American Farmland Trust (AFT), Duke Energy, EPRI, Exelon Corporation, Hoosier Energy, Markit Environmental Registry, Ohio Farm Bureau Federation, Ohio River Valley Water Sanitation Commission (ORSANCO), Tennessee Valley Authority (TVA), Troutman Sanders, LLP, Mosaic Company Foundation, the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, and the University of California at Santa Barbara. Additionally, the SWCDs and farmers are at the heart of the project, as well as all the committed contributors to the project's five advisory committees.

Because this project is so far-reaching and the largest of its kind, it has been important to identify and engage stakeholders so that concerns are appropriately identified and evaluated. Among other activities, the project convened a series of listening sessions with farmers and SWCDs in the ORB before developing the trading plan to identify potential barriers that might discourage them from participating. The early engagement of agriculture was critical to design a system that would work for both buyers and sellers. In addition, EPRI organized and maintains several stakeholder advisory committees to provide feedback on the emerging market including agriculture, environmental groups, power companies, wastewater treatment plants, and federal and state agencies. The project is committed to an adaptive management approach and greatly benefits from the ongoing input from these committees and the public in general.

Summary

EPRI's commitment to an adaptive management approach has been fundamental to the project, as well as the unwavering commitment to defensible science and transparency. Some of the details related to the pilot trades in the ORB will need to be revisited as they are informed by project

implementation. The next phase will include describing the remaining issues before credits can be used for permit compliance obligations, such as how to provide the public the ability to ensure permit obligations are being met when trading is used. We also are gaining important information on where failures can occur in the system, necessary safety factors, and whether a 10% reserve pool is sufficient in the long run. Risks from large-scale storms or natural disasters that eliminate farm conservation projects that generated credits still need to be addressed. It is critical to recognize that not all trading programs are equal, that flexibility is likely appropriate depending on program location, and that decisions regarding credit definition, verification, and quantification are currently defined largely at the individual project level.

For the EPRI pilot in the ORB, we have taken a particularly conservative approach in evaluating program decisions to ensure that credits are "real" and decisions are reviewed, discussed, and approved by the states involved. From an economic perspective, it is still to be determined if, after applying all necessary rigor and science, the market will support the fully burdened price of credits. Ultimately, it is that issue - whether credits are real - that is fundamental to buyers committed to ensuring that their permits are met, to other stakeholders who deserve to have confidence in the system, and for the ecosystem.

More project information and updates, including a link to the on-line credit trading registry, can be found on the project website: http://wqt.epri.com. In addition, a compilation of abstracts from EPRI reports related to Water Quality Trading is included below.

We would like to thank Chairman Gibbs and Ranking Member Bishop for this opportunity to submit testimony.

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

EPRI Abstracts Related to Water Quality Trading

Full reports can be found at www.epri.com using the report number as the search term. Direct links are also cross posted at http://wqt.epri.com under the Reference Shelf.

Case Studies of Water Quality Trading Being Used for Compliance with National Pollutant Discharge Elimination System Permit Limits. **EPRI, Palo Alto, CA: 2013. 3002001454.**

While there is a great deal of published work describing and analyzing water quality trading and explaining how to engage in it, research is lacking regarding permits that use water quality trading to meet compliance obligations. This report aims to provide transparency on National Pollutant Discharge Elimination System (NPDES) permits that incorporate water quality trading through a series of 18 case studies. The research does not attempt to provide comprehensive coverage of every NPDES permit that uses water quality trading. Rather, case studies of 18 NPDES permits are provided as a sample of permits known to allow water quality trading to meet compliance obligations. The case studies focus on the language within the permit itself, supplemented with external information that provides a context for water quality trading in the permit.

Implementation of the Watershed Analysis Risk Management Framework (WARMF) Watershed Model for Nutrient Trading in the Ohio River Basin: Analysis of Scioto, Muskingum, and Allegheny Watersheds. **EPRI, Palo Alto, CA: 2012. 1025820**

As part of the Ohio River Water Quality Trading Program, the Scioto, Muskingum, and Allegheny watersheds were analyzed, using the Watershed Analysis Risk Management Framework (WARMF) model, to determine their capacity for nutrient trading. For consistency across the Ohio River Basin, the watershed models were implemented using the hydrological unit code (HUC) 10 delineation available from the United States Geological Survey. Data from the Ohio Environmental Protection Agency, Pennsylvania Department of Environmental Protection, and United States Environmental Protection Agency for point sources and water quality monitoring were used to set up the model. Agricultural nutrient loading factors were based on the most recent United States Department of Agriculture crop survey.

Barriers and Solutions for Farmer Participation in the Ohio River Basin Water Quality Trading Program. **EPRI, Palo Alto, CA: 2011. 1023642.**

As part of a multiyear collaborative effort, American Farmland Trust (AFT) convened six listening sessions with approximately 150 agricultural producers (farmers) in the Ohio River Basin (ORB) to determine their readiness to sell nutrient credits in a regional water quality trading (WQT) market. In a WQT market, municipal wastewater treatment plants, industrial manufacturing plants, and electric power companies can purchase nutrient credits to meet their regulatory requirements. They pay farmers to implement best management practices that reduce the loss of nutrients (such as nitrogen and phosphorus) and soil sediments from farms; in exchange, the farmers are given nutrient offset credits. Participants in the agricultural listening sessions identified potential barriers to their participation as credit sellers in a regional WQT program and proposed solutions to overcome those barriers.

EPRI | ELECTRIC POWER RESEARCH INSTITUTE

Use of Models to Reduce Uncertainty and Improve Ecological Effectiveness of Water Quality Trading Programs: Evaluation of the Nutrient Trading Tool and the Watershed Analysis Risk Management Framework. **EPRI, Palo Alto, CA: 2011. 1023610.**

Through a United States Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS) Conservation Innovation Grant, collaborators working on the development of the interstate Ohio River Basin Water Quality Trading Program conducted a robust analysis to evaluate possible approaches for using water quality models for crediting nutrient load reductions from agricultural best management practices (BMPs). A credit estimation method that ensures reliable and repeatable results is a critical element in a successful water quality trading (WQT) program and is something that is not always scientifically informed. This effort considers one approach for creating a scientifically informed approach that uses a combination of field-scale and watershed-scale models for crediting agricultural conservation practices. The Nutrient Trading Tool (NTT) and the Watershed Analysis Risk Management Framework (WARMF) were selected to evaluate the non-point source load reductions at the field scale and watershed scale, respectively.

The project assessed both NTT (field-scale) and WARMF (watershed-scale) models to determine the strengths and weaknesses for use in WQT. NTT was also tested by a select group of Ohio agricultural Technical Service Providers, Certified Crop Advisors, and Soil and Water Conservation Districts for applicability, user-friendliness, information content, and reliability. The project showed that both NTT and WARMF have demonstrable uses for supporting essential elements of credit calculations and policy development in WQT programs. Recognition of benefits and limitations of these tools will be critical for realizing their full potential in a WQT context. Efforts must be made to gather sufficient data and literature support for model calibration and validation. While WARMF has been tested and applied in many locations across the United States, NTT has yet to receive a similar level of scrutiny and application. Vetting by local experts and knowledgeable program participants of both the data and assumptions used by modelers is highly recommended, especially for NTT, which relies on field-specific information. In addition, recommended NTT model improvements will enhance the accuracy and performance of the tool, the results of which will increase trust and use by program participants. WQT programs can adjust for introduced errors and uncertainties by using a combination of eligibility conditions and an explicit trade ratio. These decisions can be informed by sensitivity analysis of the calibrated models, incorporation of model "goodness of fit" results, and best professional judgment. Output of these tools can be combined to provide an appropriate level of user-friendliness and pragmatic use of best available science for crediting, policy decisions, and program administration. The project also considered characteristics of a future on-line trading registry.

U.S. National Opinion Survey on Stacking Environmental Credits: Definition, Status, and Predictions of Wetland, Species, Carbon and Water Quality Credit Stacking. **EPRI, Palo Alto, CA: 2011. 1024803**

This report summarizes and analyzes the responses of a national survey entitled "Evaluation of Credit Stacking" that was developed jointly by EPRI, the World Resources Institute, Stetson University College of Law and the University of Kentucky. The purpose of the survey was to collect opinions about credit stacking from practitioners currently involved in environmental credit markets. The survey was conducted in the first quarter of 2010 and was sent to approximately 1,500 individuals residing primarily in the United States. After verification and removal of duplicate inputs, responses were received from 309 individuals. Respondents were asked to identify themselves as credit sellers, researchers, policy-makers, credit buyers or credit

exchangers. Ninety-four percent of respondents identified themselves as either credit sellers, researchers or policy-makers, and the responses from these groups were analyzed in depth.

Ohio River Basin Trading Project Agricultural Stakeholder Listening Workshops: Sardinia, Ohio, October 14, 2010. **EPRI, Palo Alto, CA: 2011. 1023133.**

On October 14, 2010, American Farmland Trust held a listening workshop in Sardinia, Ohio, to provide information to and collect feedback from farmers and agricultural representatives on the Ohio River Basin Trading Project. The session began with a basic primer on water quality trading given by Jim Klang of Kieser & Associates. The presentation was followed by facilitated discussions. Participants were prompted with a variety of questions developed from earlier listening workshops held in other regions of the Ohio River Basin and addressed issues that producers will likely face in future water quality trading markets.

Ohio River Basin Trading Project Listening Workshops: Wabash River Watershed, Indiana, March 8-9, 2010. **EPRI, Palo Alto, CA: 2010. 1021543.**

In March 2010, American Farmland Trust held two listening workshops in the Wabash River Watershed to provide information and collect feedback on the Ohio River Basin Trading Project. Each session began with a basic primer on water quality trading given by Jim Klang of Kieser & Associates. The presentations were followed by facilitated discussions. Participants were prompted with several questions developed from earlier listening sessions addressing issues that producers will likely face in water quality trading markets.

The session held during the March 8 workshop in Bluffton, Indiana was coordinated with the Conservation Technology Information Center and the Indiana Farm Bureau to identify and invite producers, Soil and Water Conservation District (SWCD) staff, and others in the Upper Wabash with an interest in water quality. The Indiana Farm Bureau also participated in identifying attendees for the March 9 workshop in Terre Haute, Indiana, which was targeted to producers within the Wabash River Basin with an interest in water quality trading.

Ohio River Basin Trading Project Soil and Water Conservation District (SWCD) Informational Meeting: Columbus, Ohio, July 6, 2010. **EPRI, Palo Alto, CA: 2010. 1021539.**

On June 17, 2010, an invitation for an informational meeting was sent jointly by the executive director of the Ohio Department of Natural Resources, Dave Hanselmann, and the president of the Ohio Federation of Soil and Water Conservation Districts (SWCDs), Lawrence Burdell. This invitation was sent to all SWCDs in Ohio as well as a few additional interested parties. On July 6, 2010, project collaborators met with the invitees at the Ohio Department of Natural Resources in Columbus, Ohio. Nearly 80 attendees representing 39 SWCDs discussed the project, captured concerns, and considered various costs and benefits for SWCD participation in this effort.

Ohio River Basin Trading Project Joint Session Air, Water, Climate: March 15, 2010– Orlando, Florida. **EPRI, Palo Alto, CA: 2010. 1021502.**

Electric Power Research Institute (EPRI) project managers in air, water, and climate programs are working together to address the complex, interrelated issues associated with water and air quality in the United States. This session provided background and told the story of the pilot effort in the Ohio River Basin to develop broad, nontraditional collaborations that will support multi-stakeholder programs for water quality trading, carbon trading, and ecosystem services

protection. Through this pilot effort, EPRI Environment Sector programs are providing leadership in addressing difficult ecological problems.

***Watershed Modeling in the Ohio River Basin: Scientific Foundations.* EPRI, Palo Alto, CA: 2010. 1021542.**

Under funding from the U.S. Department of Agriculture (USDA) and the U.S. Environmental Protection Agency (EPA), academic collaborators are calibrating the Watershed Analysis Risk Managment Framework (WARMF) to be used during the design and implementation of the Ohio River Basin Trading Project. The WARMF model will be instrumental in simulating the water quality benefits of various rules in the trading program. In addition, the model will be useful for adaptively managing the trading program, once trading begins, to optimize the water quality benefts and improve project implementation. This effort will help ensure that the primary goal of a water quality trading program is achieved—to improve the quality of water and reduce nutrient loading in a cost-effective manner.

***Developing Greenhouse Gas Emissions Offsets by Reducing Nitrous Oxide (N_2O) Emissions in Agricultural Crop Production: Final Project Report.* EPRI, Palo Alto, CA: 2009. 1020546.**

This final project report describes a three-year long EPRI supplemental project entitled *"Developing Greenhouse Gas Emissions Offsets by Reducing Nitrous Oxide (N_2O) Emissions."* This EPRI-sponsored project investigated an innovative approach to developing large-scale, cost-effective greenhouse gas (GHG) emissions offsets that potentially can be implemented across broad geographic areas of the United States and internationally.

***Program on Technology Innovation: Ohio River Water Quality Trading Pilot Program — Business Case for Power Company Participation, 2008.* EPRI, Palo Alto, CA: 2010. 1018861.**

Nitrogen discharges to surface waters from power plants are increasing as technologies such as selective catalytic reduction units, electrostatic precipitators, and flue gas desulfurization systems are installed to comply with more stringent air emission requirements. The nitrogen generated by these processes is being transferred to surface water discharges. Concurrently, water quality impairments by nitrogen, new instream nutrient criteria, and anticipated effluent limitations on total nitrogen discharges are now actively being pursued by regulatory agencies. Although only a few power plant National Pollution Discharge Elimination System (NPDES) permits reviewed during this 2008 feasibility assessment contain nitrogen limits (or monitoring requirements), the promulgation of nutrient criteria (which will be followed by effluent limitations), is anticipated for Ohio in 2008, Kentucky and along the main stem of the Ohio River by 2010, and West Virginia by 2011. A preliminary feasibility analysis, described in this report, presents a strong business case for power company participation in the development and promotion of a water quality trading program in the Ohio River Basin. Such a program has the potential to reduce the costs of complying with water discharge restrictions.

***Program on Technology Innovation: Modeling Nutrient Trading in the Ohio River Basin; Theoretical and Practical Consideration.* EPRI, Palo Alto, CA: 2009. 1018691.**

Nutrient trading to achieve water quality objectives has the potential for achieving environmental objectives and ecological outcomes in a cost-effective manner. An important driver for a nutrient trading program is to provide a means for major dischargers to meet the effluent objectives

using more cost-effective trades with other dischargers or with non-point sources. Key to the success of a trading program is a thorough understanding of the watershed, its various components, the key stakeholders and their emissions, as well as the expected watershed response. A modeling framework that supports development of the trading program can provide some important insights for areas that are not meeting objectives that may not be detected by a monitoring program. These conditions can result in exceedance of the objectives, as well as the potential benefits of different trades. The current project developed the WARMF model for two watersheds in the Ohio River Basin: the Muskingum and Scioto watersheds. The model was used to identify water quality hotspots, understand the temporal pattern of water quality exceedances, determine the likely extent of local/regional trading areas, assess the magnitude of loads in a given trading area, determine the sensitivity of different regions to load reductions, and evaluate specific trades and trading ratios. The current approach is at a large scale, useful for scoping the potential for trading. A more detailed WARMF model can be set up for more local trading scenarios using the current model to provide the boundary conditions for the detailed local model.

Methodologies for Cross-Pollutant Trading. **EPRI, Palo Alto, CA: 2008. 1014025.**

Cross-pollutant trading expands the range of cost-saving opportunities by allowing dischargers to earn credits for reducing loads to the watershed of complementary pollutants that contribute to the same common water quality impairment. This report technically evaluates methodologies for cross-pollutant trading in the context of opportunities for the electric power industry. The report is of value to environment managers within power companies, as well as regulators, water resource managers, and environmentalists.

Program on Technology Innovation: Water Quality Trading Pilot Programs—Review of Catawba River Basin, Chesapeake Bay, and Ohio River Pilot Projects. **EPRI, Palo Alto, CA: 2007. 1015409.**

Water quality trading (WQT) has potential as an alternate means for power facilities to meet compliance goals with nutrient discharge limits, particularly for nitrogen. EPRI is working to identify and conduct a feasibility study for a WQT pilot project involving one or more power companies. This white paper summarizes general information on three potential pilot project locations, describes the screening criteria used to evaluate the potential of each project location, and completes a SWOT (strengths, weaknesses, opportunities, and risks) analysis for each.

Program on Technology Innovation: Water Quality Trading Program for Nitrogen. **EPRI, Palo Alto, CA: 2007. 1014646.**

Anthropogenic releases of nitrogen have greatly increased environmental fluxes of biologically available nitrogen and contributed to serious ecological problems, such as algal blooms that cause waters to become severely depleted of oxygen. Power plant sources of nitrogen include NO_x air emissions, the ammonia required for the Selective Catalytic Reduction (SCR) and Selective Non-Catalytic Reduction (SNCR) systems that are used for NO_x reduction, and the ammonia used for SO_x control and ash pond conditioning. As part of its efforts to manage nitrogen pollution and improve water quality in the United States, the EPA has issued a Water Quality Trading Policy that enables and supports the adoption of market-based programs for improving water quality by allowing for the trade of credits that represent net nutrient reductions, including nitrogen. EPRI Technical Update 1013193, *Water Quality Trading Opportunities for Electric Power Companies: EPRI White Paper*, presented the background and concept of water quality trading, introduced potential opportunities for power companies related to managing

nitrogen, and identified the primary information gaps that need to be filled in order for EPRI members to benefit from EPA-endorsed water quality trading programs. This technical report is a follow-up to that Technical Update and provides more details regarding the drivers for trading, characteristics of successful trading programs, and the process for establishing a trading program.

Program on Technology Innovation: Water Quality Trading Opportunities for Electric Power Companies: EPRI White Paper. **EPRI, Palo Alto, CA: 2006. 1013193.**

With electric utilities contributing to nutrient loading in waterways, it is important to identify the most effective options for reducing this environmental impact while still accommodating business goals. In the past, these two goals—business performance and environmental protection—have competed. However, water quality credit trading, a strategy supported by the U.S. Environmental Protection Agency, provides an alternative approach for utilities to simultaneously meet economic and ecological objectives.

Water Quality Trading Guidance Manual: An Overview of Program Design Issues and Options, **EPRI, Palo Alto, CA: 2002. 1005179.**

The U.S. Environmental Protection Agency (EPA) actively promotes water quality trading (WQT) as a tool for more cost-effectively attaining water quality standards, which are currently not met in nearly half of the nation's streams and water bodies. This market-based approach builds on the success of emission trading programs for sulfur dioxide and nitrogen oxides. The water quality context, however, differs in many important respects from the air quality context, and there is as yet little experience with successful WQT programs. This report provides WQT program developers with an overview of issues they will need to address and summarizes relevant lessons from existing WQT programs.

Written Statement for the Record

Submitted by: American Farmland Trust

The Role of Trading in Helping Watersheds Achieve Water Quality Objectives with the Help of Agriculture

Submitted to:

United States House of Representatives

Committee on Transportation and Infrastructure

Subcommittee on Water Resources and Environment

April 24, 2014

Contact:

Dr. A. Ann Sorensen, Assistant V.P. for Programs and Research Director

American Farmland Trust

155 North Third St., Suite 200

DeKalb, IL 60115

asorensen@niu.edu

American Farmland Trust (AFT) appreciates the opportunity provided by Chairman Gibbs, Ranking Member Bishop, and Members of the Subcommittee to comment on water quality trading. AFT was founded in 1980 by farmers and citizens to meet an urgent need that was not being addressed by other groups: the rapid loss of farmland to development and the need for better environmental stewardship of farm and ranch lands. For 34 years, AFT has helped to protect millions of acres of working lands by championing the creation of federal, state and local farmland protection programs and policies. AFT has also helped to expand stewardship on many acres of working lands through advocacy for federal and state conservation programs and on-the-ground demonstration projects, often working with local farmers to reduce water pollution in key watersheds. AFT promotes farming practices that are environmentally responsible, yet economically viable. Through this work, it has earned the respect of farmers, ranchers and conservationists, and their organizations.

A long-term goal for AFT is to accelerate the adoption of conservation practices by agricultural producers that enhance soil health, reduce nutrient runoff, improve water quality and address a changing climate. With finite farmland resources, conservation practices can help soils build the resiliency needed for economic and environmental sustainability in the future. Our interest in private ecosystem services markets is deeply rooted in our history and our primary goal is for these markets to succeed. Fully functioning ecosystem service markets can harness private funding to help producers implement more conservation practices where they will do the most good. AFT has focused our work on farmers who will be selling credits and how to engage agriculture from the beginning to help set up these markets thereby increasing the chances that farmers will participate in trading. We are helping the Electric Power Research Institute (EPRI) and other collaborators set up the nation's first regional Water Quality Trading market in the Ohio River Basin (ORB) and we are also involved in efforts to set up ecosystem services markets in Minnesota, Pennsylvania and Washington. In particular, the ORB market has set itself apart from other efforts from the start. First, there are

many potential buyers (point sources) in a large regional market, resolving some of the uncertainties and limitations faced by potential credit sellers (farmers). Second, the involvement of high visibility collaborating partners (including the federal agencies and state permitting authorities) provided "instant credibility" and a sense on the part of the agricultural stakeholders that a fully functional market was a probability, not a possibility. And third, the intent to work with the State permitting authorities to identify state-approved incentives for the early, voluntary participation by buyers meant the project did not necessarily have to rely on impending in-stream nutrient standards for the Ohio River to bring buyers to the table. Our experiences in developing this market have broadened our understanding of the both the potential and the challenges of WQT. AFT also recently completed an analysis of the economic, social and environmental impacts of WQT.

To this end, we want to touch on three critical areas that are important to consider about WQT: 1) the multiple benefits offered by this approach may make it very attractive for watersheds to consider; 2) it is important to view markets from a producer's point of view; and 3) the need to establish guidelines and best practices to improve consistency, innovation and integrity in WQT.

Multiple Benefits of WQT

Since few WQT programs have been empirically analyzed, definitive evidence that WQT programs produce positive financial, environmental and social effects is still limited. However, the most recent global review of watershed payment programs concludes that the widespread adoption of ecological investment mechanisms like WQT should be a key part of any strategy for ensuring secure and sustainable water systems. The low trading volume in most programs involving point and nonpoint source trading prohibit quantitative measurements. Although the potential for achieving greater cost-effectiveness remains the chief motivating factor for most programs, the environmental

and social effects of trading - although more difficult to quantify - are benefits that watersheds miss when they rely on upgrades to wastewater treatment plants alone. In addition, markets can also help encourage early progress towards water quality standards and achieve water quality improvements more quickly.

Many of the conservation practices that generate nutrient offsets or credits in WQT programs produce additional environmental benefits, particularly if enhancements to the practices are encouraged or required. Filter strips (areas of grasses and herbaceous plant species) also provide food and cover for wildlife and pollinators and help sequester carbon in soils. Grass waterways (a type of conservation buffer that drains runoff water from adjacent croplands and trap soil sediments and nutrients) can also provide food and cover for wildlife and sequester carbon. Conservation tillage (leaving crop residue undisturbed for as long as possible) also provides food and cover for wildlife, increases carbon sequestration and improves soil health and soil tilth. Cover crops (grasses, legumes or forbs planted to provide seasonal cover on cropland when the soil would otherwise be bare) also increase soil biological diversity, attract beneficial insects, serve as a trap crop for damaging insects, help sequester carbon and provide food and cover for wildlife and pollinators. Heavy use pads (concrete or gravel in areas where there are too many animals to maintain vegetation) can also improve animal health and well-being. Livestock exclusion fencing (to prevent livestock from trampling stream banks and degrading streams) can also help restore areas that provide food and cover for wildlife. Enhanced nutrient management (which manages the amount, form, placement and timing of the application of nutrients) can also reduce nitrous oxide emissions, a potent greenhouse gas. Improving soil health by sequestering carbon can also make soil nutrients more available to plants and further reduce fertilizer use.

Retiring water quality credits to accelerate water quality improvement and/or defining the proportion of credits that must be purchased in addition to the credits needed to meet regulatory obligations is another unique environmental improvement that WQT program can offer. WQT programs are also developing and improving innovative tools

that help measure nutrient run-off from farm fields, streamline application, monitoring and verification procedures and track credits on-line. Federal and state cost-share programs may be able to use some of these improved methodologies along with WQT's focus on performance to improve the cost-effectiveness of their efforts. As more trading programs emerge and trading activity increases, the environmental effects of more conservation on the ground and the social effects of encouraging dialogue and allowing offsets that enable communities to grow may be the most persuasive reasons for watersheds to include trading in their tool box.

Viewing markets from a producer's point of view

To ensure the participation of producers in emerging markets, they need to be involved early on in setting the market up. Based on the listening sessions AFT and others have held with producers, the following steps are critical: 1) **Engage agriculture early in the process:** Fully engage the agriculture industry in the creation and operation of these markets; 2) **Design a strong, credible and defensible market:** The market must produce real credits with a genuine value. There must be an agreed upon way to measure outcomes and the trades must be credible to all stakeholders. The market should help point and nonpoint sources work together to improve water quality more rapidly and not as just a way for regulated entities to avoid dealing with pollutants. The market also must be consistent over time so farmers are comfortable signing up for contracts and can rely on payments being made; 3) **Provide transparency:** The market operation should be as transparent as possible and the process used to generate and sell credits must be clear to all; 4) **Use trusted science:** Base the market's measures, practices and policies on trusted science from credible sources; 5) **Provide a fair payment:** Producers must receive a fair and realistic price for the services rendered and payment amounts must be substantial enough to justify participation; 6) **Maintain trust:** The parties engaged in trading must trust one another. For producers, this means the market should provide reasonable assurance that any information revealed about their participation does not expose them to potential enforcement or increased regulatory

action; 7) **Offer flexibility:** The system must be sufficiently flexible to accommodate new crops, improved conservation practices, new market conditions, or other altered circumstances in agriculture. When unforeseen circumstances arise (like extreme weather events), producers need to be able to terminate contract obligations without undue consequences; 8) **Use an independent clearinghouse or registry:** The market should operate through a clearinghouse run by a trusted third party that can provide participants with information about credit values and practices; and 9) **Early outreach and inclusion will lead to a more robust market:** Educate farmers, environmentalists and the public as to the benefits and operations of these markets.

We cannot emphasize enough the importance of USDA's and US EPA's involvement in unlocking the potential of WQT. WQT offers significant regulatory flexibility and substantial reductions in the cost of environmental quality improvement. Its benefits will not be achieved, however, absent ongoing strategic investments from both the NRCS, through their Conservation Innovation Grants and the U.S. EPA via their targeted watershed grants. The existing, ongoing partnership of state and federal, public and private entities in development WQT remains critical and instrumental in helping get this promising tool used to its full potential

There are several other critical decision points for agriculture. Markets need to understand how farmers use conservation practices in the watershed to help select the practices they approve for credit generation. Enlisting farmers to help decide which practices to credit may increase the chances that farmers will sign up and that the pre-approved practices will work for the type of farming in the watershed. Understanding which practices are considered "conventional" and which are considered "cutting edge" can help programs focus on practices that farmers are receptive to implementing and better understand the degree of technical assistance that might be needed. It is also important to keep in mind that practices that take corn acres out of production (like buffers) can reduce subsidy payments for that farmer since the corn base is used to

calculate certain farm payments. The loss of farm payments until the corn base is re-established is a notable risk.

As programs start to design the market structure, they need to work with producers to address a number of issues with the complexity of the market, administrative support, contracts and pricing. To participate in a WQT program, the learning curve and access to the market must be low cost, readily available and as simple as possible. Programs should take steps to simplify the information or its delivery so that producers readily understand the program and its commitments. This may include short, simple contracts, easy to understand educational materials and knowledgeable program staff. Even with efforts to simplify the WQT process for producers, challenges and difficulties could remain. Areas of WQT complexity include complicated credit estimation processes, inability to evaluate and select the optimum credited practice for a given site to be cost-competitive in the market, and paperwork and reporting requirements for facilitation of credit certification and annual tracking. To overcome the complexity associated with these procedures, a trained facilitator or service provider can assist the producer. Producers are already wrestling with many complex decisions even prior to considering WQT and would rather have trusted representatives (preferably ones with which they have already developed a relationship) to walk them through these steps.

Deciding which farmers can participate and which credits qualify is a critical decision for WQT markets. Known as agricultural "baselines," these requirements help ensure that any credits entering the market are additional water quality improvements that would not otherwise have taken place. Baselines provide additional reassurance that the WQT program is helping contribute to water quality goals and not in some way undermining them. Baselines should be transparent, easy to verify and result in real and meaningful pollution reductions at a reasonable cost. If baseline requirements are too stringent and expect farmers to implement a lot of conservation practices at their own expense before trading, few farmers will participate. But if they are too lax, they may fail to

harness the incentive power that markets potentially have to facilitate environmental improvements.

Finally, producers want WQT to work seamlessly with the other conservation incentive programs available to them. The most likely partnership for WQT programs is with USDA NRCS' Environmental Quality Incentives Program (EQIP), a very popular program that is habitually over-subscribed. The challenge is that WQT favors projects based on their cost effectiveness whereas EQIP uses limited environmental targeting and has a fuzzier accounting of benefits, weaker focus on cost-effectiveness, lower eligibility requirements and minimal monitoring. On the other hand, EQIP and WQT policy are more or less aligned philosophically and some state ranking procedures now favor targeting, benefit calculation and cost-effectiveness. In these cases, the conservation districts (local EQIP administrators) could recruit farmers for EQIP and later target the same farmers for WQT once they have met the baseline requirements. To make this happen, WQT programs would have to work directly with the state and county NRCS technical advisory committees—and obtain the blessing of NRCS at the federal level. The Agricultural Act of 2014 recently authorized a new conservation program, the Regional Conservation Partnership Program (RCPP) which holds tremendous promise for environmental targeting and outcome-based conservation. RCPP represents a new approach for farm bill conservation programs that has tremendous capacity to complement WQT programs. Regardless of what programs are utilized, it makes intuitive sense for WQT to work in partnership with at least some of these over-subscribed public cost-share incentive programs as a way to recruit farmers whose applications addressed water quality issues but were not funded.

Best practices to improve consistency, innovation and integrity in WQT.

In 2013, several groups who were working on WQT trading programs came together to form the National Network on Water Quality Trading. The Willamette Partnership and World Resources Institute are acting as National Network coordinators and USDA and

EPA are serving as technical advisors. AFT is one of several network participants and we are currently recruiting more representation from agriculture. The purpose of the National Network is "*to establish a national dialogue on how water quality trading can best contribute to clean water goals. That includes providing options and recommendations to improve consistency, innovation, and integrity in water quality trading.*" This national community of WQT practitioners is developing shared principles and using lessons learned from existing WQT programs to provide recommendations for core trading program design elements and for implementing and operating trading programs. These guidelines, expected in Fall 2014, will help improve consistency and integrity across WQT programs and will make it easier to establish WQT programs, provide greater transparency about what WQT program help to accomplish and help WQT programs meet their clean water goals.

Summary

As a national organization focused on protecting farmland, AFT is concerned about maintaining the long-term sustainability of the nation's farmland resources in an era of numerous water and climate challenges. Keeping farmers, especially family farmers, on the land requires that we meet those challenges. Environmental services markets and WQT are promising approaches that can help producers implement conservation practices on their farmland that improve soil health, reduce nutrient runoff, improve water quality, and help farms adapt to a changing climate. The National Network on Water Quality Trading's forthcoming principles, guidelines and recommendations on best practices is a significant step in the evolution of these markets. There are still many issues to be resolved but AFT believes it is WQT is an approach well worth pursuing. Continued national leadership from USDA and EPA, along with better coordination among major conservation and WQT programs in addressing remaining challenges may help us unleash the potential of WQT.

○